Quatsino Sound

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Purpose

This policy document has been developed cooperatively by the **Coast and Marine Planning Branch, BC Ministry of Sustainable Resource Management** and the **Central Coast Regional Office of Fisheries and Oceans Canada**. It is intended to provide direction for provincial tenure approval in the intertidal and nearshore environment of the Plan Area and policy guidance for Fisheries and Oceans staff within the Quatsino Coastal Management Area.

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Acronyms and Definitions

Aquatic Lands: Provincially owned seabed covered by coastal "inland waters", or waters "within the jaws of the land" (intra fauces terrae). Inland waters are waters within an indented coastline, such as harbours, bays and estuaries, including areas between headlands along the outer coast. The Supreme Court of Canada, in a 1984 decision, also confirmed the Province's ownership of the waters and the lands, minerals and other natural resources of the seabed and subsoil in the Georgia, Juan de Fuca, Johnstone and Queen Charlotte Straits

Blue Listed Species: Includes any indigenous species or subspecies considered to be vulnerable in British Columbia.

CMPB: Coast and Marine Planning Branch, MSRM.

CCG: Canadian Coast Guard, Fisheries and Oceans Canada.

CDC: Provincial Conservation Data Centre, Ministry of Water, Land and Air Protection.

COSEWIC: Committee on the Status of Endangered Wildlife in Canada.

CWS: Canadian Wildlife Service, Environment Canada. Addresses wildlife matters that are the responsibility of the federal government. These include protection and management of migratory birds, nationally significant habitat and endangered species.

DFO Department of Fisheries and Oceans (also known as FOC: Fisheries and Oceans Canada).

LWBC: Land and Water British Columbia Inc.

MAFF: Provincial Ministry of Agriculture, Fisheries and Food.

MOF: Provincial Ministry of Forests.

MSRM: Provincial Ministry of Sustainable Resource Management.

MWRD: Mount Waddington Regional District.

WLAP: Provincial Ministry of Water, Land and Air Protection.

Foreshore (intertidal) area: The area between the mean high tide and low tide mark (i.e. below zero tide).

Invertebrates: Within plan context includes commercially and recreationally harvested marine invertebrate species, specifically, red and green urchins, octopus, crab, prawn, shrimp, sea cucumber.

Land Act Notation of Interest: A notation on LWBC reference maps of an interest in an area of Crown land by another government agency. It ensures an initial referral to agencies whose particular mandate, programs or interests may be affected by the issuance of tenure, and provides the opportunity for the affected agency to identify priority issues, concerns or conditions. It may be used over areas where further planning is contemplated. It does not preclude the acceptance of land applications.

Land Act Reserve: A reserve established on LWBC reference maps to temporarily withdraw Crown land from disposition by tenure. A reserve is placed over an area to permit other agencies to undertake planning, to provide temporary protection or to maintain options for future use.

Nearshore area: The subtidal area below low tide mark (i.e. below zero tide), generally extending to the 20 meter bathymetric depth.

No-Staking Reserve: A reserve for to either prohibit location (staking) of a claim or to restrict the rights acquired. It prohibits the location of a mineral and/or placer claim, and a "conditional"

reserve stipulates the specific conditions or restrictions which apply to a claim located within the reserve. These reserves only affect claims located or recorded after the effective date of the reserve.

Offshore area: The subtidal area seaward of the 20 meter bathymetry depth.

Red Listed Species: Includes any indigenous species or subspecies that have, or are candidates for status as extirpated, endangered, or threatened species in British Columbia.

Risk: Risk is unavoidable and present in virtually everyday human situations and has many acceptable definitions, all with the common theme of uncertainty of outcomes. Here, "risk" refers to the uncertainty that surrounds future events and outcomes. It is the expression of the likelihood (i.e. probability) of a negative effect (i.e. hazard) occurring. Although risk is quantifiable in some cases, frequently professional judgement and experience are used to assess whether risk is high, moderate or low.

Shellfish Aquaculture Biophysical Capability: The potential for an area to successfully accommodate the growing or cultivation of shellfish for commercial purposes, based on measurement of biological, physical and oceanographic parameters using standard methods and equipment.

Tenure: A legal right to occupy and use Crown land under the Land Act. A tenure may take the form of a permit, license of occupation or lease. The type of tenure is normally dictated by LWBC policy and conveys different rights, terms and conditions of use and occupancy.

Upland: The terrestrial area extending approximately 200 meters inland from the highest tide line.

UREP: A Land Act reserve or notation of interest established for the "use, recreation and enjoyment of the public."

1.0 Introduction

1.1 Location

Quatsino Sound is situated on the west coast of Vancouver Island, British Columbia (Figure 1). The Sound is the most northerly of Vancouver Island's west coast inlets lying north of the Brooks Peninsula and south of Cape Scott and lies within the traditional territory of the Quatsino First Nation. The area also lies within the Regional District of Mount Waddington. Port Alice is the only incorporated municipality in the Plan Area; other settlements include Holberg, Coal Harbour, Quatsino and Winter Harbour. The population of the area is approximately 2000.

Figure 1.Quatsino Sound, regional setting

The Quatsino Sound Coastal Plan Area comprises the inner waters of Holberg, Rupert, Neroutsos Foward and Ahwhichalto Inlets and Winter Harbour, as well as the Pacific Coast of Vancouver Island from Cape Scott Provincial Park in the north to the Brooks Peninsula Provincial Park in the south. Klaskino and Klaskish Inlets have also been included. The Plan Area extends westward approximately 15 km to include Brooks Bay and the offshore approaches to Quatsino Sound to a depth of 200m.

The Plan Area includes land or waters associated with protected areas, although Plan direction for these areas is limited to federal management of the water column. Provincial protected areas include the Brooks Peninsula, Kwakiutl Lawn Point, Quatsino, Marble River, Raft Cove and Cape Scott Provincial Parks and Klaskish River and Solander Island Ecological Reserves.

The Plan Area extends approximately 75 kilometres from east to west, and encompasses approximately 680 kilometres of shoreline and 1400 square kilometres of marine waters.

1.2 Plan Rationale and Intent

The Vancouver Island Land Use Plan recommended that Quatsino Sound be given a high priority for coastal planning. This area has similarly been identified as a priority coastal planning area by the Mount Waddington Regional District. The larger Quatsino Coastal Management Area has been identified by Fisheries and Oceans Canada as a pilot coastal management area under the federal Oceans Strategy.

Many coastal communities in British Columbia have experienced significant economic decline and population loss due to reductions in industrial forestry and commercial fishing. Many of those communities are looking for opportunities to diversify and expand their economies in a sustainable manner that will protect local ecosystems.

The Quatsino Sound Coastal Plan Area supports a range of economic activities. These include various commercial fisheries, finfish aquaculture, shellfish aquaculture, log handling and storage, marine transportation, and tourism. It also contains an array of sensitive resources and cultural values. Through coastal plans such as this, the Ministry of Sustainable Resource Management

(MSRM) identifies development opportunities and provides land management that fosters economic development and environmental conservation. These outcomes benefit coastal communities as well as the province.

There is growing interest and expectation that First Nations will play a greater role in the economic activities occurring in their traditional territories. The Quatsino First Nation has used the Quatsino Sound area for centuries and the use and health of its resources remain vital to their cultural and economic well-being.

Federal and provincial governments have responsibilities that relate to supporting economic and social development while protecting the environment for future generations. A priority of the Ministry of Sustainable Resource Management (MSRM) is to use coastal planning to enhance sustainable economic development opportunities of coastal communities (including First Nations communities) while maintaining environmental values. The Quatsino Sound Coastal Plan provides the basis for coastal development on an environmentally sustainable basis. This Plan is consistent with the Ministry's draft governance principles for sustainable resource management, presented in Appendix 1.

1.3 Jurisdiction and Scope

Jurisdiction* in the coastal zone is complicated by the relationship between land (including seabed) ownership and legislative authority over resources. There is a common public misconception that the Province has no jurisdiction or role in coastal management, due to federal government authority over fisheries management, marine mammal management, migratory birds, and marine transportation and safety, and the high profile of these issues in coastal communities.

The seabed along British Columbia's western coastline from the low water mark, or from the boundaries of inland waters, seaward to the territorial limit are owned by the federal government. The Province, however, is an important land owner in the coastal zone. The Province owns the foreshore (intertidal) areas of its coastline. In addition, the Province owns coastal "inland waters", or waters "within the jaws of the land" (intra fauces terrae), and the lands covered by these waters. Inland waters are waters within an indented coastline, such as harbours, bays and estuaries, including areas between headlands along the outer coast. The Supreme Court of Canada, in a 1984 decision, also confirmed the Province's ownership of the waters and the lands, minerals and other natural resources of the seabed and subsoil in the Georgia, Juan de Fuca, Johnstone and Queen Charlotte Straits. Thus, many sub-tidal areas are also owned by the Province. The Province's ownership and legislative jurisdiction over such matters as the management of provincially owned public lands, provide the rationale for provincial coastal planning, park and ecological reserve establishment, and tenure of coastal foreshore and inland waters.

The Oceans Act provides the legislative framework for the national management of Canada's oceans. Canada's Ocean Strategy is the Government of Canada's policy statement for the management of estuarine, coast and marine ecosystems. The Act appoints the Department of Fisheries and Oceans (DFO) as the lead federal department in oceans management. In addition to Oceans Act implementation, DFO is also responsible for management and enforcement associated with a suite of federal legislation ranging from the Fisheries Act to Navigable Waters Protection Act. Other federal legislation, including the Canadian Environmental Assessment Act and the Species at Risk Act also influence coastal management. See Appendix II for a listing of applicable legislation and links to the responsible government departments.

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* This overview is neither a legal interpretation, nor a position statement of the Government of Canada or Province of British Columbia; nor does it address First Nations' rights and title issues.

Local governments and private property owners also influence coastal management activity, due to upland owner rights and decisions and local government plans, zoning by-laws and development requirements. In addition, First Nations have legally established Aboriginal rights that may be potentially affected by coastal developments, and which must therefore be taken into account by the provincial government in the decision making process for foreshore and nearshore use applications. Provincial consultation policies reflect recent court decisions and require provincial agencies to seek to accommodate First Nations interests in land use decision making processes.

This Plan provides recommendations for acceptable uses in the foreshore and nearshore, which is under provincial jurisdiction. These recommendations address a range of tenure programs that are administered by Land and Water British Columbia Incorporated (LWBC). The Plan also addresses recreation and conservation values that should be reserved or withdrawn from tenure opportunities. In some areas, the Plan also contains recommendations for resolution of issues concerning the interaction of fisheries, public recreation, navigation and other activities that are not administered by the province. Foreshore and coastal portions of provincial parks are included in the Plan to support the evaluation of unique or sensitive habitat across the Plan Area and to facilitate coordinated federal management of resources in these areas. Areas of environmental sensitivity that may be subject to additional federal assessment are also identified, where possible.

This Plan does not make recommendations regarding use of private land, federal land, or Indian Reserves. Its recommendations will not limit any treaty negotiations or settlements that may occur respecting foreshore and nearshore rights, ownership or uses. Its recommendations are also not intended to alter or interfere with provincial legislation or local area by-laws, although it is preferred that local government plans and this plan be compatible.

Planning Process

The planning process used to develop and complete the Quatsino Sound Coastal Plan is generalized in Table 1. The process was led by government staff and used a consultative approach to public and interest group engagement, rather than consensus-based negotiation using stakeholder planning tables.

Table 1. Generalized planning process for the Quatsino Sound Coastal Plan

April 2002	Confirm provincial technical team and terms of reference Confirm process with Quatsino First Nation and Regional District (RDMW)
June – December 2002	Develop and acquire resource data and appropriate map products Develop preliminary background description Develop understanding with DFO on collaborative planning
January 2003	Hold first Plan public open houses. Confirm membership of planning advisory committee (PAC)
February – June 2003	Develop draft planning unit recommendations with PAC Review draft plan products with Quatsino Band Council
April 2003	Prepare economic and environmental assessment of Plan Place Plan draft on web site for review
August 2003	Review draft Plan with stakeholder groups, government agencies; make appropriate revisions Hold open houses to present plan; make appropriate revisions
October 2003	Formal review by Quatsino Band Council and RDMW Sign-off by provincial government

2.0 Plan Area Description

2.1 Physiographic and Oceanographic Resources

Geology and Terrain

The land and ocean bottom of Quatsino Sound form part of the Wrangellia terrane, a piece of the earth's crust driven by tectonic forces against the North American continental plate. The pressure from this collision resulted in the formation of the Coast Mountain Range. Similarly, the merging or accretion of the Pacific Rim terrane against the western extent of the Brooks Peninsula provides an explanation for the rugged landscape of that area. Distinct from the North American plate, the Wrangellia terrane itself includes diverse geology. While much of the bedrock in the area is granite, significant limestone deposits in the western portion of the area have been chemically and physically weathered to create the eroded cave environment known as karst topography.

In the modern geological period (over the past 2 million years) glaciation has had a significant impact on the shape of the land. Glaciers covered the entire area (with the possible exception of part of the Brooks Peninsula) repeatedly over the millennia, at times with up to 1 km or more of ice. This huge weight shaped the modern land's valleys and carved the area's characteristic fjord-like inlets. Glacial retreat left behind the mixed gravels which today cover much of the lower elevations and seafloor.

The primary physical feature of the Plan Area is Quatsino Sound itself, which extends approximately 20 km into Vancouver Island before branching into southern (Neroutsos Inlet) and northern arms (Holberg and Rupert Inlets). The relatively narrow entrance to Quatsino Sound results in two dramatically different environments; the rugged, high –energy outer coast and the more sheltered inlets.

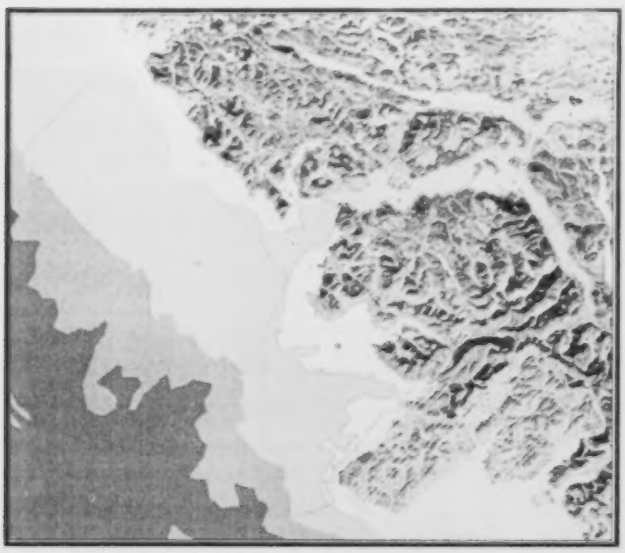

Figure 2. Quatsino Sound Coastal Plan Area
Yellow lines identify planning subunits within Plan Area. Graduated shades of blue indicate varying water depths from shallow (1-20m in white) to abyssal (>1000m in the darkest blue)

Climate

Quatsino Sound has a mild, wet climate due to the impact of the Pacific Ocean. Winter months experience the heaviest precipitation. Snow and freezing temperatures may occur in winter, but tend to be less severe and shorter lasting than in continental areas.

Summers are mild and somewhat drier. Transitions between seasons are gradual. This provides an extended growing season for shoreline vegetation and forests, and in concert with the abundant rainfall, supports high biological productivity. The high levels of rainfall wash nutrients from the soil quickly, and soils in the area tend to be unsuited to agriculture.

Environment Canada weather stations provide 'normals' or averages of monthly temperatures over long periods. Records for four communities in Quatsino Sound reveal fairly consistent daily mean temperatures in the range of 3 to 4 degrees C in the coldest month, January, and about 15 degrees in the warmest month, August. Data from the Kains Island Light Station demonstrates the moderating influence of the Pacific Ocean compared with the more sheltered locations alng the Inner Sound. Victoria, by comparison shows a similar moderating effect due to the city's proximity to the ocean and the effect (Figure 3).

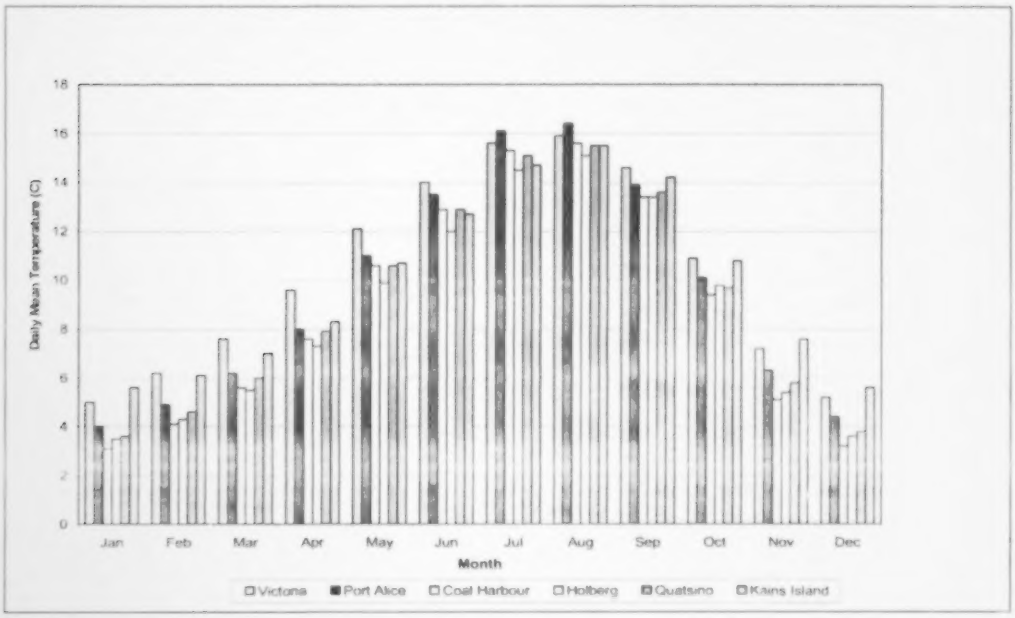

Figure 3. Daily Mean Temperatures for Quatsino Sound communities
A comparison of stations in Quatsino Sound with Victoria. Source: Environment Canada Climate Norms

The moderate temperatures mean some ice may form in freshwater-rich inlets in winter, but it is not a major factor in marine activities. For the purposes of marine transportation, Quatsino Sound may be considered ice-free year-round.

The Quatsino Sound area is rainy. The most inland station, Holberg, recorded an average of nearly 4 meters of precipitation annually. To put this in context, Victoria has very similar temperatures to Quatsino yet receives less than one-fourth the precipitation of Quatsino Sound, showing the effect of the Sound's exposed coastal position (Figure 4).

Although temperatures at all four Quatsino Sound stations are very similar, there is a pronounced increase in precipitation as one moves from the west coast to the inland inlets. This is the result of moisture-laden winds from the Pacific Ocean being forced to rise over the bulk of Vancouver Island. As the air rises it become cooler and less able to hold its moisture, producing more precipitation.

The implication for marine planning is that significant levels of stream deposition are likely as a consequence of surface run-off from precipitation. The numerous fluvial fans that mark the shoreline of Holberg Inlet provide visible evidence of the impact of precipitation on the structure of the nearshore marine environment.

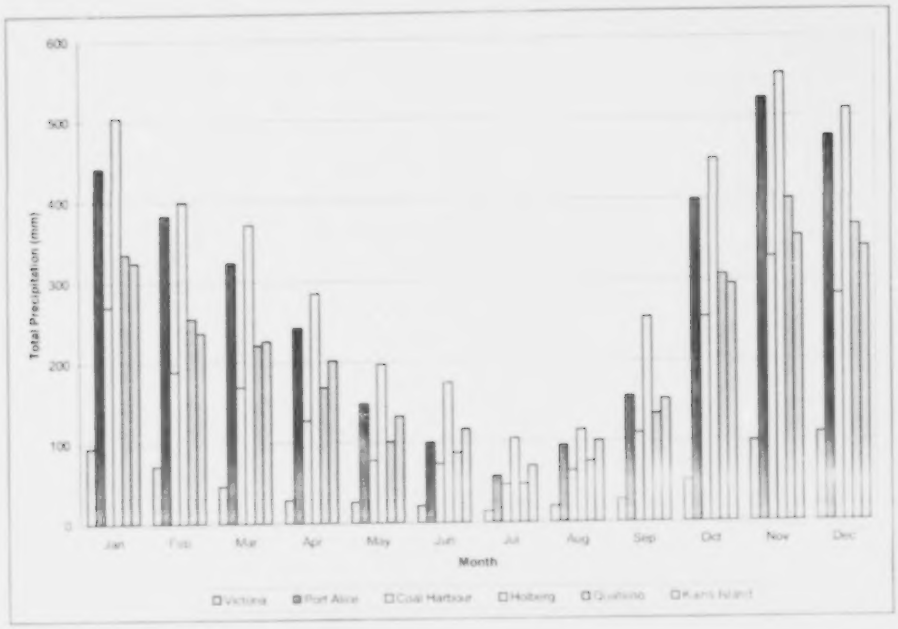

Figure 4 Precipitation Monthly Mean (Average)

Precipitation records for stations in or near Quatsino, with comparison to Victoria

Winds off the northern tip of Vancouver Island are among the strongest on Canada's coastlines, and winter storms pose a significant challenge to shipping, fishing and marine activities. The entrances to Quatsino Sound in particular are subject to strong winds. The interior portions of the Sound tend to provide a degree of protection from winds. The orientation of Holberg-Rupert Inlets, and to a lesser degree Neroutsos Inlet, matches prevailing winds however, which can channel winds to produce dangerous conditions for marine activities (Figure 5).

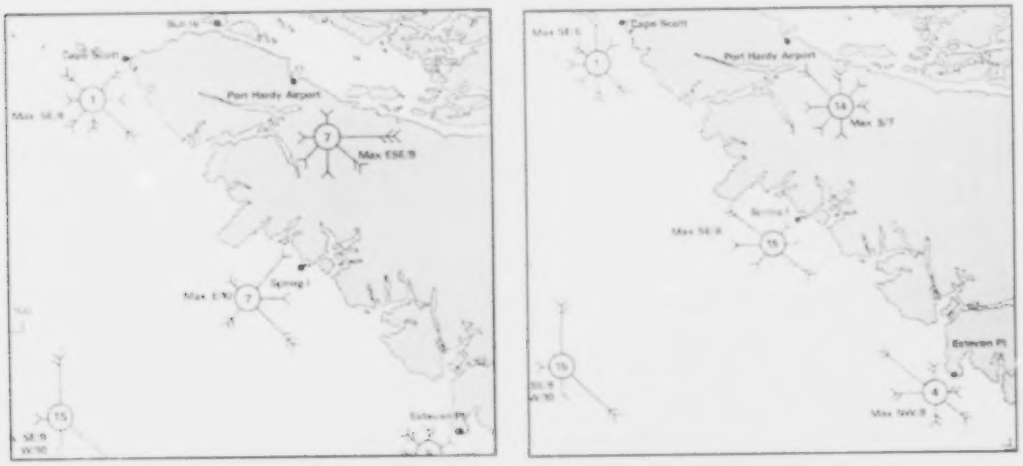

Figure 5 Prevailing Winds

Wind Roses show direction and strength of winds at stations near Quatsino in January (left) and July (right). Length of arrow indicates proportion of time wind comes from that direction, number of 'feathers' on arrows indicates strength of strongest winds from that direction, and number in circle shows percentage of calm air.

Tides and Currents

The North Pacific Current, driven by the northeast trade winds generally reaches North America at the latitudes of Vancouver Island. This large current, moving heat from the tropics toward the polar region, splits as it nears North America, fanning southward to form the California Current and northward to drive the Alaska Current. The area where the North Pacific Current encounters North America varies with the season, from further south in winter to further north in summer, producing generally northward prevailing offshore currents at Quatsino in winter which become weaker in summer and may even shift to slight southward currents (Figure 6).

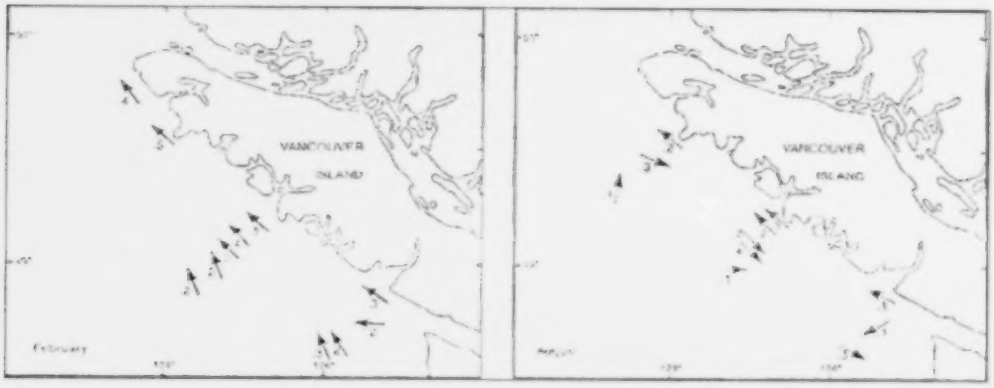

Figure 6. Nearshore currents on West Coast of Vancouver Island.
Winter currents shown at left, summer at right. Source: Sailing Directions, Canadian Hydrographic Service 1990

These currents have a major impact on the climate of the area, moderating temperatures and providing moisture for high precipitation levels. They also transport debris – and possibly pollutants – from the Asian side of the Pacific Ocean.

2.2 Marine Ecological Attributes

In an effort to better structure marine information, the Province has adopted a model that used physical characteristics of the marine environment to define and differentiate habitat types across BC's coastal waters. The British Columbia Marine Ecological Classification http://srmwww.gov.bc.ca/risc/pubs/coastal/marine/index.htm#marineecoclass.methods) represents a hierarchical approach that uses physical characteristics of the marine environment to identify distinct systems within the larger marine environment. The utility of this system is that it is based upon data that is generally accessible for the entire coast and upon elements that remain largely consistent even in the dynamic marine environment. At the most precise level (marine ecounits), defining criteria included: wave exposure, depth, subsurface relief, seabed substrate, current regimes. A follow up to the original study was completed in 2002 and added slope, temperature, stratification and surface salinity to the existing criteria while refining the depth criteria and modelling of relief (Axys, 2002 http://srmwww.gov.bc.ca/dss/rpts/BC%20Marine%20Ecological%20Classification%20Final%20Report.pdf) . Each of these criteria enables a better understanding of the influences a body of water is subject to and provides a better sense of its characteristics as habitat and its capability to support human uses and activities. To better understand the implications of these criteria, they are detailed below.

Wave Exposure

Wave exposure serves broadly to distinguish the open coast from island groups and inlets and provides a measure of the mechanical wave action on the shore. Exposed areas with high energy

wave climates characteristically exhibit a shoreline composed of rocky headlands and sandy embayments. The shoreline of low exposure (and correlating low wave-energy conditions) is more closely reflective of upland processes, including stream run-off and erosion. Intertidal and nearshore biota vary considerably between high exposure coastlines and protected shoreline, although this is less of a factor for bottom dwelling, or benthic, organisms.

The outer coast of Vancouver Island is clearly a high exposure environment while the narrow entrance to Quatsino Sound limits the effects of ocean conditions and results in the inshore arms of the Sound being assessed as low exposure. Note, however, that Holberg Inlet, although highly sheltered from ocean conditions, experiences significant wave events due to its orientation in line with prevailing winter winds. From a human use perspective, sheltered areas are generally more attractive for structures as added construction requirements for durability and reduced operating windows typically result from increased exposure.

Depth

Depth serves primarily to distinguish between areas where sunlight can penetrate to the bottom (photic zone) and deeper areas. As sunlight drives photosynthesis, static marine plants are generally concentrated in shallower areas providing both nutrients and habitat for other organisms. In terms of human use, depth is a factor in determining the form a nearshore structure should take (i.e. floating vs. fixed) and may also be an indicator of an area to absorb by-products of activities (i.e. greater theoretical dilution of waste material in deeper sites). Within Holberg Inlet and along the coast line of Vancouver Island, there is a considerable amount of photic depth area (20-50m). Interestingly, the greatest extent of shallow (0-20m) water is along the exposed outer coast of Vancouver Island. The structure of Holberg Inlet, with its rapid deepening in the lower (eastern) third is suggestive of a drowned postglacial hanging valley. Mid-channel depths throughout Quatsino Sound are generally classed as mid-depth (50-200m).

Benthic Relief

Seabed or benthic relief refers to the overall regularity of the seabed. An area with low relief will have a relatively uniform slope and little variation in elevation such as a flat mud bottom. High relief areas exhibit considerable ranges in slope and elevation, as in the case of a rock reef. Relief plays a role in water column mixing but more obviously, an area with high relief is indicative of habitat for many organisms, notably rockfish and lingcod. Quatsino Entrance, marked by the Gillam Islands, is one of only two high relief areas along the west coast of Vancouver Island. There, the combination of high relief and exposure to the open ocean results in a well mixed and productive marine environment which supports extensive breeding colonies of storm-petrels, gulls, cormorants, alcids and shorebirds.

Seabed Substrate

Seabed substrate ranges from mud through sand to hard surfaces, including bedrock, boulders, cobble and gravel and is an important indicator of habitat. Substrate also provides a sense of system energy; fine sediment such as silt takes relatively little energy to be held suspended in the water column while considerably more energy is required to mobilise larger cobble. Consequently mud bottoms typically occur in low energy, depositional environments while harder materials (rock and gravel) represent higher energy, frequently scoured environments. Structures located on mud or sand have a higher potential to alter sediment transport and deposition rates than those located on rocky surfaces. The outer coast, Quatsino Entrance, Winter Harbour, Quatsino Narrows and the channel north of Drake Island are classed as possessing hard seabed substrate while the remainder of Quatsino Sound is classed as mud bottomed.

Currents

Currents represent an important consideration in the distribution of nutrients and planktonic larvae and serve as an indicator of water stratification. Areas of high current are generally well-mixed with higher productivity levels than similar low current areas. As a rule, human activities generally avoid high current areas where lower current areas provide alternatives due to the inherent design and management challenges of higher energy conditions. Exceptions may be made for culturing practices that rely upon current flow for oxygenation and dispersal of wastes. The Plan Area is assessed as a low current environment, with the exception of the high current areas north of Drake Island through Quatsino Narrows and Quatsino Entrance. In both instances high currents can be attributed to the high volume of water forced through relatively narrow passages.

Water Temperature and Salinity

Temperature is a factor in marine environments due to its influence on species assemblage. Temperature is known to be a factor in habitat selection for certain organisms including invertebrates and larval fish. With respect to the Plan Area, water temperature correlates fairly closely with water depth and current; shallower unmixed water is generally warmer.

Salinity is affected primarily by the volume of freshwater runoff entering the coastal area. Inshore waters, such as along coastal fjords, often exhibit seasonal fluctuations in salinity in keeping with seasonal variations in freshwater runoff. In some cases salinity may actually be higher in nearshore areas as shallow depths and limited circulation result in evaporation taking on greater significance. Salinity is a factor in the establishment of certain marine plants and may also be a factor in the siting of intertidal and nearshore cultivation.

The inlets branching onto Quatsino Sound generally have lower sea surface salinity rates due to fresh water input from streams and rivers. This fresh water layer can be pronounced in Neroutsos, Rupert, Holberg and Ahwhichaolto inlets, and may cause some surface ice in winter. Shallow Ahwhichaolto Inlet above Winter Harbour is particularly vulnerable to this kind of icing. Because most of the rivers are relatively short-run, their flows closely reflect the seasonal variations in rainfall. The largest single source of freshwater in the Sound is the Marble River, which enters near Quatsino Narrows, where the fresh water is readily mixed by vigorous tidal currents.

Summary Ecosystem Profile

Figure 7 and Figure 8 present graphic depictions of the distribution of these ecological attributes across the West Coast and specifically to the Quatsino Sound Plan Area. The largest area, the Pacific Ecozone includes all marine waters on Canada's West Coast. Not surprisingly, this area is dominated by the deep waters and flat, low relief benthos of the Pacific Ocean. As the area under study focuses more closely upon the coastal nearshore, the physical variability of the marine ecosystem increases. In terms of those values identified within the Quatsino Sound Coastal Plan Area, areas of high current and high relief stand out as the least common ecological features. Excluding Quatsino Narrows (included in Marble River Provincial Park) the high current environment is limited to 46 hectares in Planning Unit 11: Quatsino Entrance. High relief seabed features are also identified in the adjacent Planning Units 10: San Josef – Cape Parkins and 12: Southern Approaches.

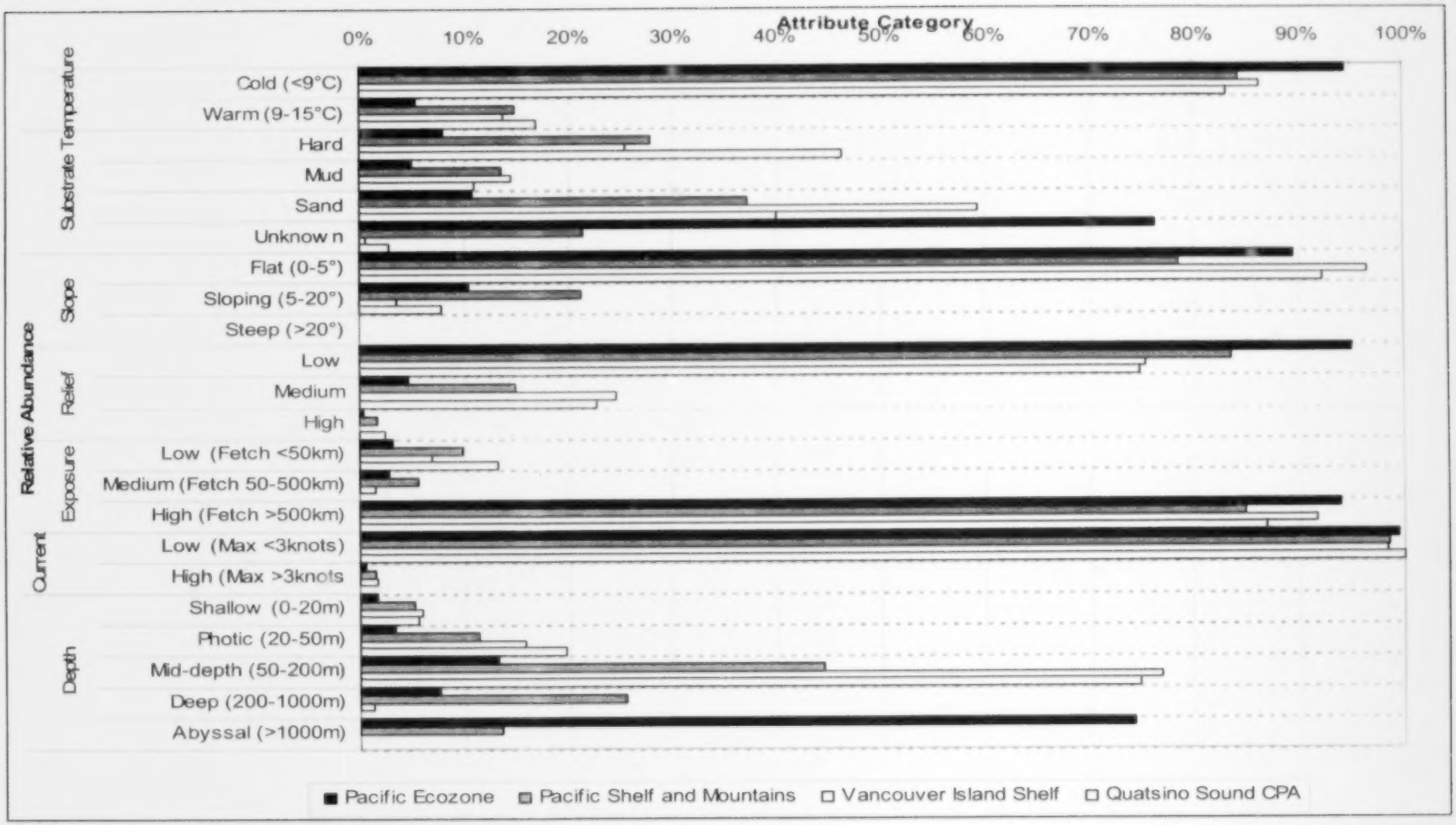

Figure 7. Relative Distribution of Marine Ecological Attributes on the West Coast

The Pacific Ecozone includes all Canadian waters off the BC Coast, Pacific Shelf and Mountains is limited to the nearshore waters of Queen Charlotte and Vancouver Islands, mainland fjords and channels except the Straits of Georgia and Juan de Fuca. Vancouver Island Shelf includes the marine waters of the Vancouver Island Shelf Ecosection. Quatsino Sound CPA is limited to the area addressed by the Quatsino Sound Coastal Plan.

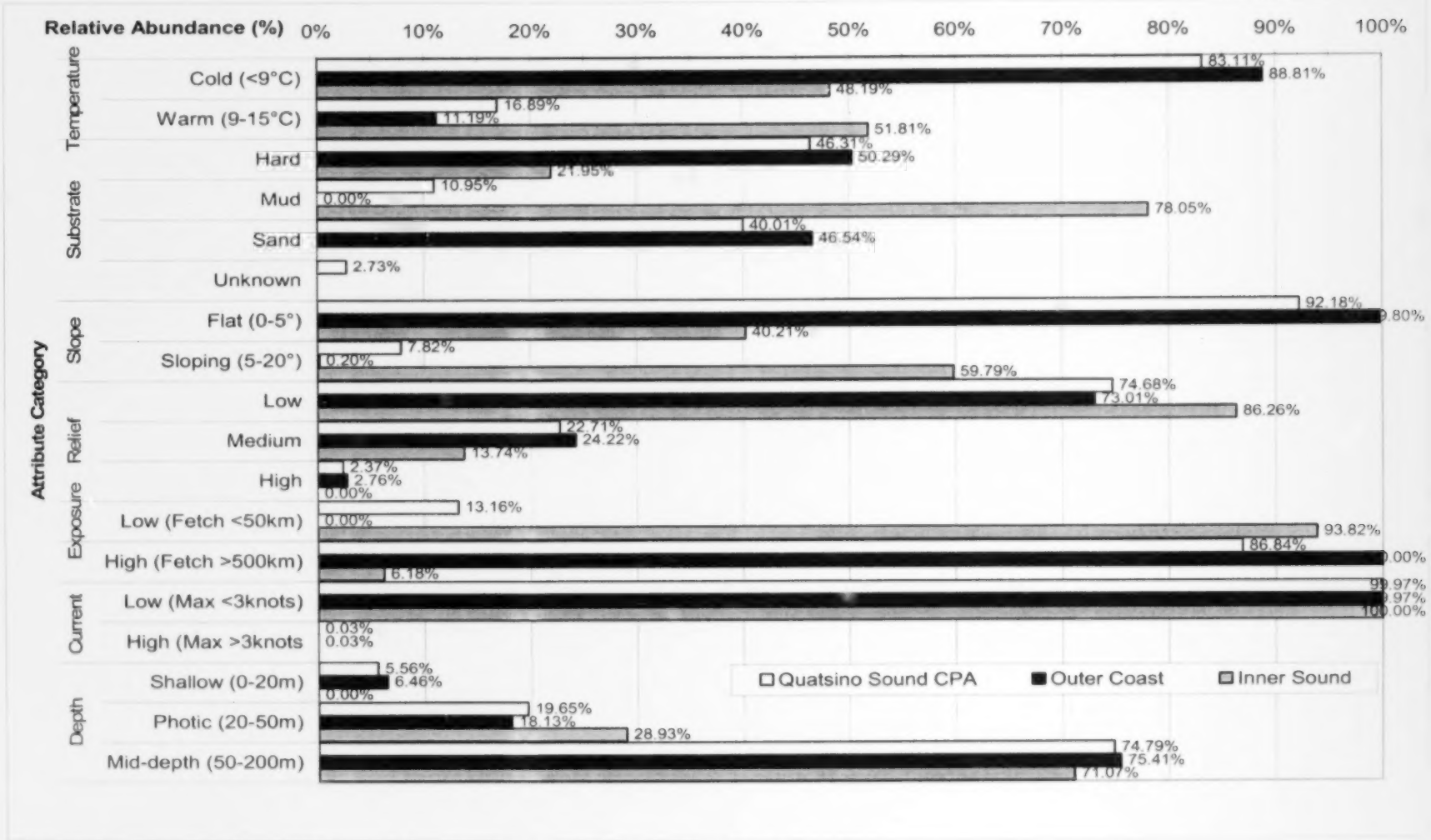

Figure 8. Comparison of Marine Ecological Attributes between Outer Coast and Inner Sound Planning Units
The Inner Sound includes Units 1-9, 13, 14 while the Outer Coast consists of Units 10-12 &15

2.3 Shore-Zone Physical Features

The most stable marine systems are those found at the interface between marine and terrestrial environments, both at the bottom (benthic) and along the shoreline. While the marine ecounits system is an effective instrument for assessing conditions in the more remote benthic regions, the accessibility of the shoreline allows for a precise examination of substrate and structure. Originally undertaken in response to concerns regarding the impact of marine oil spills detailed physical shore-zone mapping of the British Columbia coastline has been underway for several decades (Howes, Harper & Owen, 1994 http://srmwww.gov.bc.ca/risc/pubs/coastal/pysshore/index.htm). This work provides a framework for recording of shore morphology, shore-zone substrate and wave exposure characteristics (Howes, 1997 http://srmwww.gov.bc.ca/dss/rpts/BCBiophysicalShore-ZoneMapping.pdf).

Table 2. Shore Type Classification Criteria

Shore Type Classification	Criteria	Characterisation	
Substrate	Rock	sediment absent or extremely scarce	
	Rock & Sediment	sediments occur as developed beach forms or large patches	
Sediment	Gravel	>2mm	sand content <<10%
	Sand &Gravel		both sand and gravel content >10%
	Sand	<2mm	sand content >90%
	Sand/Mud	<2mm	gravel content<10%, sand
	Mud		gravel content>>10%, mud content>50%
	Organics/Fines		Estuary
Width	Narrow	<<30m	wide
	Wide	>30m	narrow
Slope	Steep	>20°	Cliff
	Inclined	5-20°	Ramp (Rock), Beach (Sediment)
	Flat	<<5°	Platform (Rock) Flat (Sediment)
Anthropogenic	permeable, impermeable	Man-made, permeable	
Man-made, impermeable			
Current- Dominated		Channel	

From Howes, Harper & Owen, 1994 Physical Shore-Zone Mapping

More recently, studies have linked these physical shoreline types to assemblages of species (Figure 9). Through field surveys, recurring groupings of species were identified and classified according to the dominant cover species, for example barnacles and mussels or Ulva green algae. These assemblages or bio bands were further defined by the color banding and texture visible from aerial or ground surveys to enable systematic inventory of the entire coast.

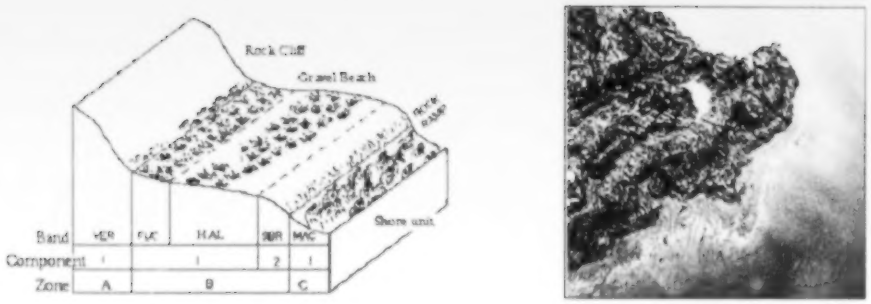

Figure 9. Shore-Zone Biobands
From Howes, Harper & Owen, 1994 Physical Shore-Zone Mapping

The resultant data provides a systematic approach to evaluating the shore-zone, arguably the most heavily impacted aspect of the coastal environment. By comparing known impacts related to structures and specific uses, a consistent approach can be used for determining the suitability of shoreline development within a planning unit.

Shore type classification provides a basis for identification of rare or unique features. With uncommon features highlighted, it is possible to more closely examine them to assess their sensitivity to development or human activities. In some cases management provisions or recommendations for further conservation assessment may be appropriate.

Rocky shore types including cliffs, platforms and rock with sand and/or gravel beaches account for more than more than half of the shoreline within the Quatsino Sound Coastal Plan Area (Figure 10). A comparison of the shoreline structure of planning units within the inner reaches of Quatsino Sound with those along the Pacific Coast further demonstrates that these shores are predominant along the outer coast (Figure 11). There, almost 90% of the shoreline falls into this general category. In a similar manner, sediment based shore lines are limited in this high energy environment with gravel beaches, sand & gravel beaches and flats and sand flats identified as the least common of shore types represented in these units.

The Inner Sound demonstrates a wider range of shore types, due to lower exposure and the addition of eroded materials from upland sources. Although rock substrate shores continue to account for half of shoreline, rock platforms and rock overlain by sand beaches are significantly less frequent compared with the Outer Coast. Sediment based shore types (sand and gravel basis) are more common, accounting for more than a third of Inner Sound shoreline.

At the Planning Unit level, the unique character of each unit becomes more apparent (Figure 12). The narrow passage linking Ahwhichaolto Inlet to Winter Harbour is the only example of a channel shore type in the Plan Area (Marble River excluded as part of a provincial park). Gravel flats and beaches are also uncommon although distributed across all Inner Sound units west of Quatsino Narrows. Gravel flats are present in just three units and primarily in only Buchholz-Neroutsos and Port Alice. In Winter Harbour gravel flats account for slightly less than 1% of the unit's shore line

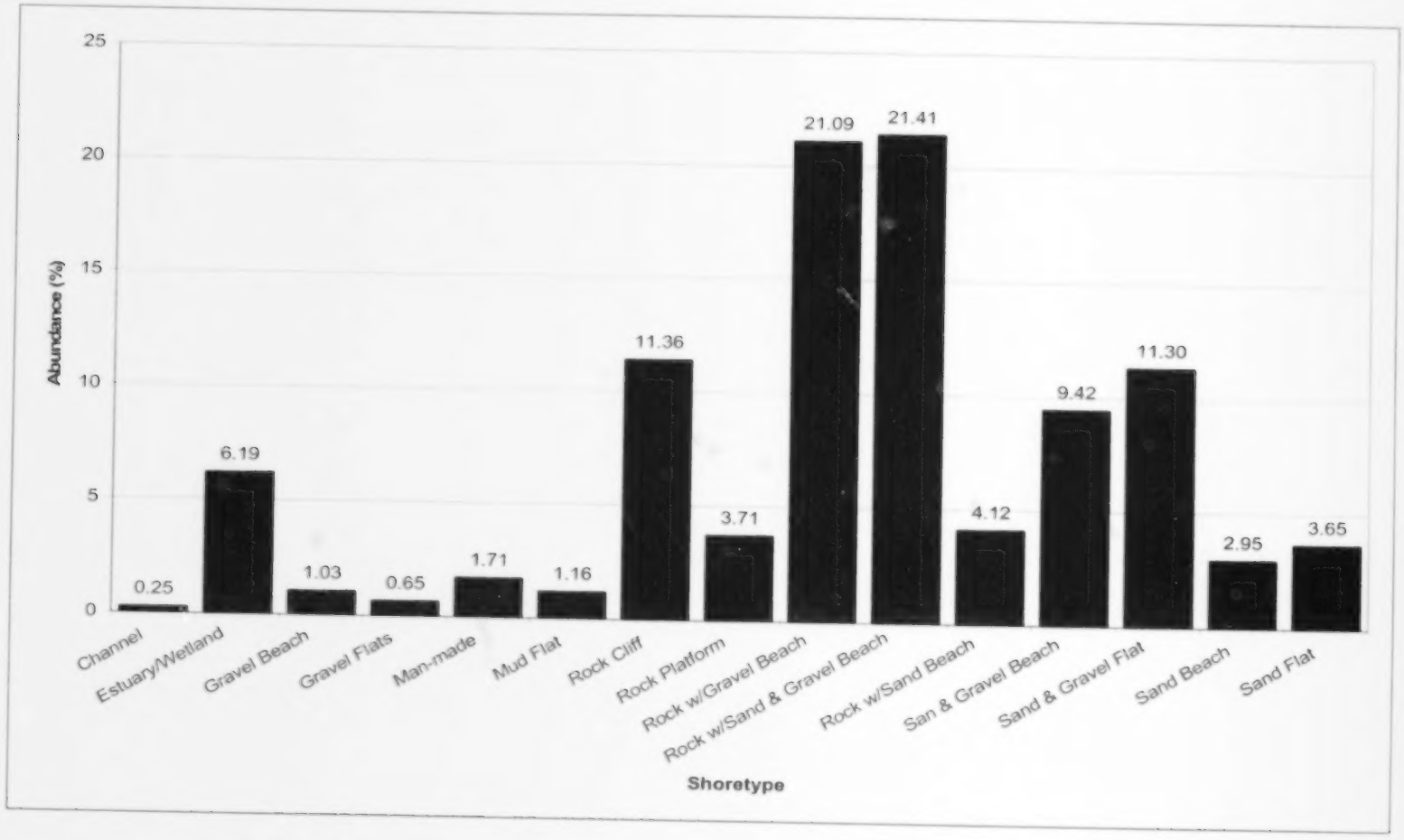

Figure 10. Relative Abundance of Shore zone types within Plan Area
Note: Shoreline of Provincial Parks within Quatsino Sound Coastal Area included in totals

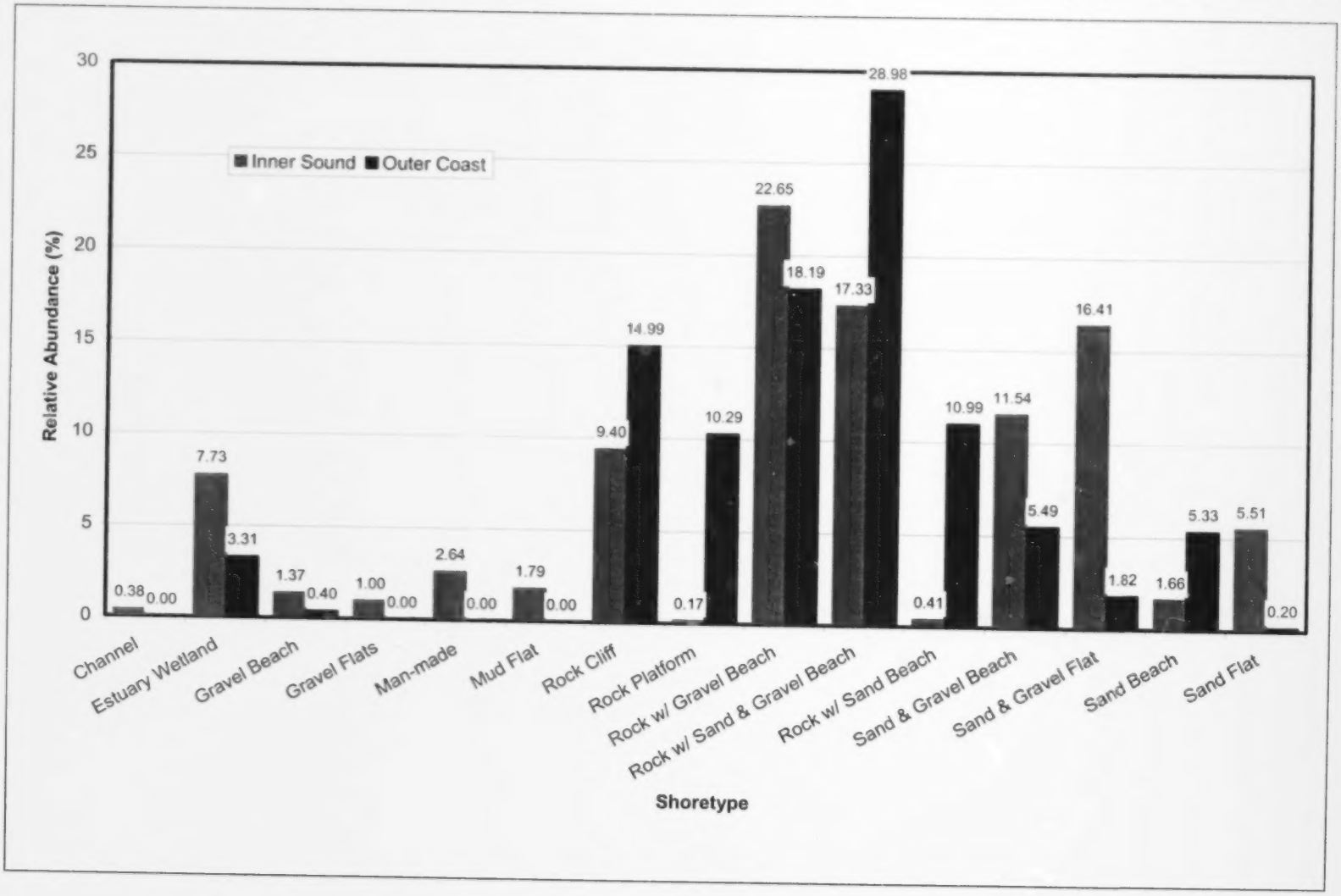

Figure 11. Shore Type Distribution: Inner Sound vs. Outer Coast

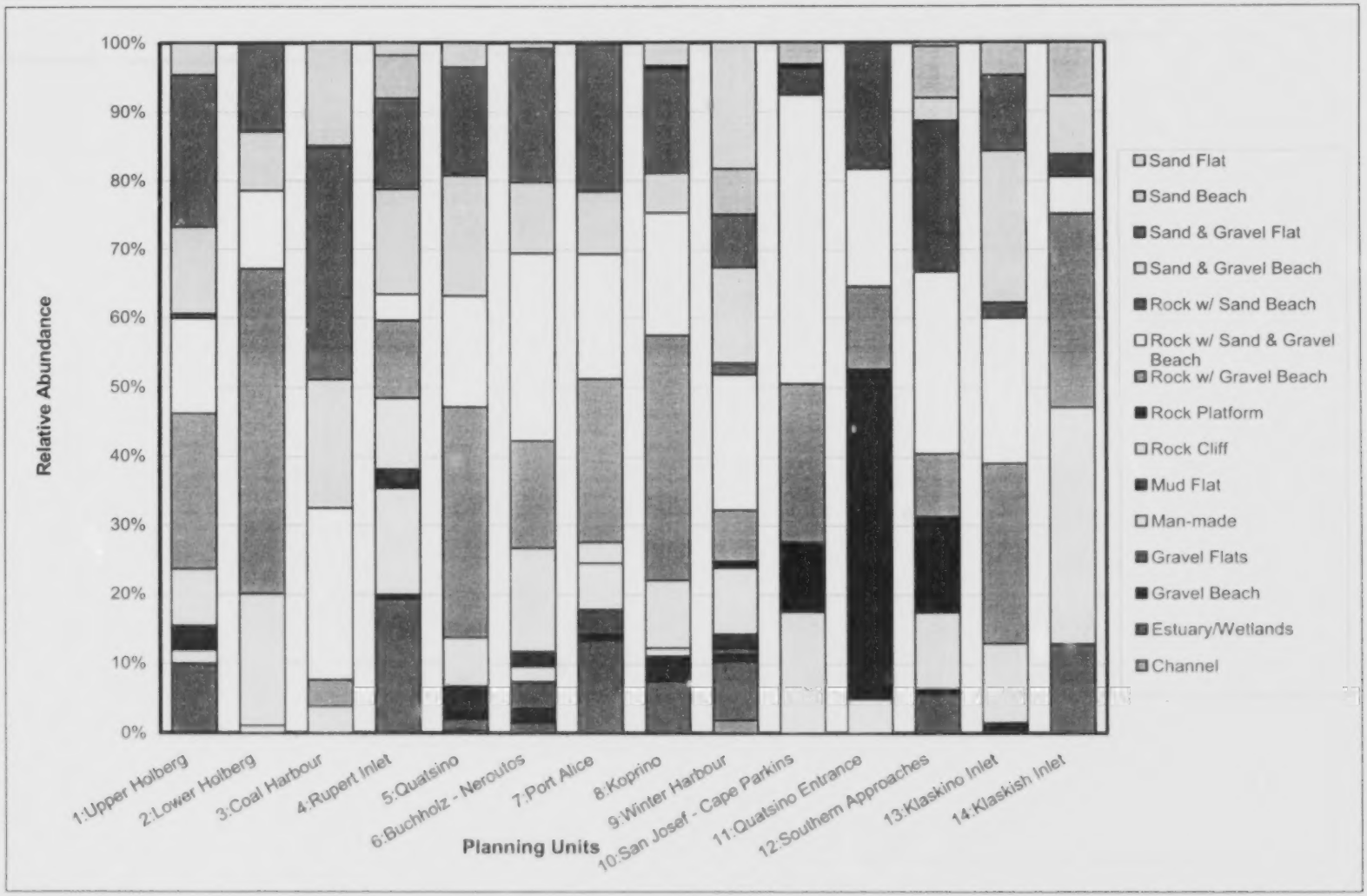

Figure 12. Shore Type Distribution by Planning Unit
Unit 15 Brooks Bay-Quatsino Approaches excluded: no shoreline in unit

2.4 Marine Habitat Types

The Quatsino Sound Plan Area consists of a diverse mixture of marine ecosystems, ranging from an extensive, moderately deep fjord system to shallow exposed, near shore habitat as you travel westward to the outer coast. The most westerly "off shore" portion of the Plan Area consists of a relatively shallow shelf feature, that extends along the west coast of Vancouver Island.

Marine habitat in the Quatsino Plan Area has been divided into 5 major categories based physical attributes including exposure, depth, substrate, current, temperature, slope and subsurface relief (Table 1). These habitat types include: shallow protected inlets, protected deep inlets, semi-exposed shallow inlets, exposed near shore and exposed offshore habitat. Following is a description of each habitat category and it's importance to ecological attributes and function. Also included is a description of the location and timing of habitat types utilized by key fish, shellfish and marine mammal species within the habitat categories outlined for the Quatsino Plan Area. Many marine species utilize more than one habitat type during varying life stages and are therefore dependant on the sustenance of natural transient processes (ie nutrient cycling) that exist between them.

Protected Shallow Inlet Habitat

Protected shallow inlet habitat is characterized by low exposure and currents with substrates dominated by mud, sand and gravel (Table 1). Water temperatures are generally cold and water depth ranges within the photic zone from 20 to 50 meters. Protected shallow inlet habitat within the Plan Area includes the upper Holberg and Coal Harbour Planning units and comprises 4515 ha or 3.3% of the total Quatsino Plan Area and 12% of the total shore length (Shoretype profile data). The shoreline areas of shallow inlet habitat are dominated by fine substrate materials, with 32.7% of the total linear mud flat habitat as well as approximately 20% of the sand and gravel beaches, flats and sand flats within the Plan Area. The salinity of the upper Holberg Inlet area is seasonally reduced by the inflow of freshwater at the west end of the Planning unit.

Goodspeed Estuary, Holberg Inlet
Photo: Rob Paynter

At the head of Holberg inlet as well as along shoreline areas where small streams enter the ocean, high value estuarine habitat and associated salt marshes, sea grass beds and tidal flats can be found. Approximately 20% of the total shoreline estuarine habitat is located in the upper Holberg/Coal Harbour planning units. Sensitive high value estuary habitat is located at the mouth of the Goodspeed River at the head of Holberg Inlet, as well as the outlets of Clesklagh Ck, Hushamu Ck, Hathaway Ck, Wanokana Ck and Nuknimish Ck along the inlet.

Estuaries are some of the most highly productive habitats in the coastal zone. Estuaries typically have a low diversity of planktonic and benthic species that can tolerate fluctuating salinity regimes, but those species present, tend to be abundant. This valuable and highly sensitive feature supports rearing habitat for numerous fish and invertebrate species. Intertidal sloughs and estuaries also provide refuge for ducks, geese and shorebirds from winter storms (Dorcey et. al. 1983). Estuarine habitat is typically associated with prime gravel beaches for clams and eel grass beds that provide herring spawning habitat.

Relatively small canopy kelp beds can be found in isolated patches within the Upper Holberg Inlet as well as in Coal Harbour. The ecosystems associated with canopy kelp beds are highly productive and provide critical rearing and spawning habitat for many fish and invertebrate species.

Protected Deep Inlet Habitat

Protected inlet habitat provides critical feeding areas and migration corridors for fish as well as marine mammals and birds. Inlet waters also provide critical habitat for prawns, crabs, sea urchins and sea cucumbers. Planning units included in the protected inlet habitat category include Lower Holberg, Rupert Inlet, Buckholz-Neroutsos, Port Alice, Koprino and Quatsino.

Koprino Inlet
Photo:Rob Paynter

Protected deep inlet habitat is characterized by low exposure; moderately deep (50-200 m) waters that are dominated by mud substrates with the exception of predominantly rock substrates in the Quatsino Planning unit. Although the inlets are protected from high wave exposure from oceanic conditions, they are susceptible to moderate wave exposure from localized outflow winds. As well, habitat in the Buckholz-Neroutsos, Quatsino and Koprino planning units are exposed to flood and ebb tide generated currents that increase nutrient availability and overall productivity in these areas. Salinity is variable throughout the inlets, with lower salinity due to freshwater inputs in Neurotsos and Rupert Inlets. This diverse habitat type represents only 14% of the total plan area but includes almost half (42%) of the total shoreline area (shoretype profile data).

High value clam beaches are most abundant in this habitat category relative to the remainder of the Plan Area. Based on shore type distributions, the majority (>80%) of gravel beaches, gravel flats, and over 60% of sand/gravel flats are located within these planning units. Sizeable clam harvesting areas have been identified in Hecate Cove, Waakwaas Creek estuary at the head of Rupert Inlet, Utah Mines Bay, Klootchlimmis Creek, Atkins Cove, Colonial/Cayeghle estuary at the head of Neurotsos Inlet, Thurburn Bay, and the Koprino River estuary. Smaller beaches that support clam production are distributed throughout the deep inlet habitat.

Almost half of shoretype classified as high value estuarine and wetland habitat is located in "protected deep inlet" habitat category. The largest estuaries are located an Waakwaas Creek, Koprino River, Kewquodie Creek, Colonical/Cayeghle Creek, Cayuse Creek and Klootchlimmis Creek. As well, the most highly rated eelgrass habitat based on biological importance is located within the Rupert Inlet sub unit. Sea grasses (Zostera marina and Zostera japonica) play an important role in primary production as well as for structural and functional integrity of intertidal zones. Sea grasses contribute to primary production through photosynthesis and also serve as a food source to herbivores. Sea grasses also produce and release dissolved organic nutrients than can be absorbed directly by marine invertebrates (O'Clair and Lindstrom, 2000). Sea grasses are structurally important for providing substratum for microalgae and invertebrates as well as nursery habitat for juvenile salmonids and shellfish species. Another important function of sea grass is their well-developed root systems that trap sediment and nutrients and stabilize marine substrates (O'Clair and Lindstrom, 2000).

As well, almost half of the rock with gravel beaches or sand/gravel beach shoreline areas are located within this habitat category. Rocky substrates provide suitable habitat for kelp and other seaweed species. Canopy forming kelp beds can be found in protected inlet habitat generally in high current channels where nutrient levels are optimal and a rocky substrate is available. Major kelp beds within the semi protected deep inlet habitat include the Bedwell Islands, Koskino Bay area, Prideaux Point, Drake Island, Farmer Islets, Banter Point, Ildstad Island, Quatsino, Hecate Cove, Quattische Islands/S entrance to

Quatsino Narrows area. The moderately deep mud bottom habitat of this habitat category supports a significant population of prawns and shrimp as well as crabs in shallower waters, enabling an annual commercial fishery.

Semi-exposed shallow Inlet Habitat

Semi exposed shallow inlet habitat includes inlets adjacent to the outer coast that are still partially influenced by exposed, ocean conditions depending on the prevailing wind conditions. Within the Quatsino Plan area, semi exposed shallow inlet habitat includes Winter Harbour, Klaskino and the Klashkish Planning Units. This habitat category is unique as it is characterized by a combination of warm, nutrient rich shallow water (20-50 m), with variable exposure and typically rock and sand substrates (Table 1). These areas represent 3.6% of the total planning area.

Approximately 20% of high value estuarine/wetland areas are located within this habitat type. Prime estuarine and mudflat habitat exists off the mouth of East Creek as well as at the head of Browning Inlet. The semi protected shallow waters typical to this habitat category, combined with suitable substrates including eel grass, rockweed and other seaweeds, supports the largest proportion of high value herring spawn habitat within the Plan Area. Herring spawn throughout Winter Harbour as well as along the northern shoreline of Klaskish Inlet. Smaller herring spawn areas are located in Klaskino Inlet.

Klaskino Inlet viewed from west
Photo: Rob Paynter

Suitable substrates in combination with warm; nutrient rich water in Klaskino Inlet yields the highest rated commercial clam harvesting values within the Quatsino Plan area. Approximately 46% of the shoreline length of the Klaskino Inlet consists of sand and gravel beaches or rock with gravel/sand. Prime clam harvesting sites include beaches along the upper north and south shores, as well as the head of Klaskino Inlet. Good clam beaches are also located at the mouth of Jims Creek and westward along the bay and the embayment southeast of Langsdorff Point.

High value canopy kelp bed habitat has been identified at the entrance to Winter Harbour from the Hunt Islets inland to the Hazard Point area. Canopy kelp beds are generally located along exposed and semi-exposed coastlines and in areas of upwelling or high current channels where nutrient levels are high and a rocky substrate is available. The kelp fronds are attached by a "holdfast" to rocky substrates and grow from the zero tide level, or just above, to about minus 12 meters depending on the water clarity. Kelp may grow on unstable substrates such as cobble but beds tend to be less stable in such areas. The ecosystems associated with canopy kelp beds are highly productive and provide important habitat for many fish and invertebrate species as well as suitable herring spawn habitat.

Exposed Near shore Habitat

Coastal near shore habitats are generally considered to have the highest ecological significance and consist of high value tidal flats, canopy kelp beds, subtidal rocky reefs, fringing reefs habitat, submerged pinnacles, exposed rocky islets and wide-spread intertidal habitat. Approximately 22.1% of the total Quatsino Sound Plan Area consists of exposed near shore habitat and includes the San Joseph/C. Perkins and Southern Approaches planning units (Table 1).

Pocket beaches, rocky shoreline near Klaskino Inlet
Photo: Rob Paynter

High exposure, hard substrates and sand beaches dominate this habitat category. Based on shoreline types, 84% of the total linear length of rock platforms and rock with sand beaches are located within the near shore habitat category within the Plan Area. As well, the exposed near shore area contained 47% of the sand beaches within the Quatsino Plan Area. The shallowest water found in the Plan Area is along the littoral margin of the outer coast from San Josef Bay south to Klaskino Inlet, with water depth less than 20 m. The adjacent outer waters remain shallow and within the photic zone with depths up to 50 m.

Intertidal and shallow subtidal rocky reefs provide a highly complex benthic structure important for the production of ground fish species including lingcod (Ophiodon elongatus) and many rockfish species (Sebastes sp.). These near shore features also provide a diverse habitat for micro- and macro-algae, benthic invertebrates and many species of non-commercial fish. The majority of over 1.4 million known marine organisms are benthic, with 98% of them living in the intertidal or shallow near shore habitat (Eichbaum et al., 1996, Hickman et al., 1986). Reefs include areas with hard rock bottom with complexity created by rocky outcrops surrounded by boulders and/or cobble.

Rocky islets are another important component of near shore habitat and provide critical bird nesting habitat, Pinnipeds haulout areas and surrounding waters provide sea otter feeding areas. Near shore islands or islets within the plan area include Gulliams Is, Hackett Is, Clerke Islet, Gillam Islands, Pinnacle Is, Rugged Is and other islands at the entrance to Klaskino Inlet and Rowley Reefs.

Along the near shore habitat areas, the combination of nutrient rich upwelling areas and shallow warm water creates optimal conditions for primary production during the summer months. An indication of high marine productivity is the presence of high concentrations of phytoplankton sometimes referred to as "algal blooms", which can effect light penetration into the water column and cause perceptible color change. Some plankton species produce potent biotoxins that are concentrated when the algae are consumed by certain benthic invertebrates. With bivalves in particular, these blooms pose a seasonal public health hazard in the Plan Area. Other phytoplankton species like the diatom Chaetoceros sp. reproduce in long chains and have spicules that can irritate the lamellae of fish. Chaetoceros sp. poses a risk to fish farms during summer months when the organism can reach high concentrations. Under natural conditions fish simply relocate where phytoplankton concentrations are less.

The exposed near shore habitat category includes the most valuable and extensive kelp beds within the plan area. The predominantly rocky shoreline of the Quatsino Sound area supports a rich biota of attached marine algae or "seaweeds". The three main groups of seaweeds are browns, greens and reds, characterizing their differing adaptations for light absorption. The green seaweeds typically occupy the upper intertidal area, while the brown seaweeds are found in the lower intertidal and the reds in the lower intertidal to subtidal waters. A group of brown seaweeds known as "kelp" are among the most conspicuous and abundant seaweeds in the Plan Area. The main kelp species are the giant kelp

(Macrocystis integrifolia) and bull kelp (Nereocystis luetkeana). Canopy forming kelp beds are generally located along exposed and semi-exposed coastlines, and in areas of upwelling or high current channels where nutrient levels are optimal and a rocky substrate is available. Ecosystems associated with kelp forests have been shown to be up to three times more productive than kelp limited benthic communities, and provide important nursery habitats for sea otters, salmonids, herring, shellfish, and other invertebrate and finfish species (Duggins et. al., 1989). Major kelp beds within the exposed outer Quatsino coast are located from San Josef Bay south to Cape Palmerston, the north and south entrances to Raft Cove, Topknot Point, Cape Parkins, Harvey Cove, Rowley Reefs and the Kwakiutl Point area.

Rowley Reefs: kelp beds surround rocky islets
Photo: Rob Paynter

Exposed Offshore Habitat

Exposed offshore habitat is dominated by high exposure, typically cold, moderate (50-200 m) to deep (200 – 1000 m) waters with an approximately equal proportion of rock and sand substrates (Table 1). Over half (57%) of the total Quatsino Plan Area lies within the offshore habitat type and includes the Quatsino Entrance and Quatsino Approaches Planning Units.

Offshore habitat provides a critical migration corridor for whales, sea lions, anadromous salmonids, birds, as well as providing key habitat for other finfish species including halibut, ground fish and rockfish stocks. Offshore waters also support pelagic bird species as well as valued First Nation, commercial and sport fisheries. Maintenance of the existing pristine offshore habitat conditions is critical for continued production of migratory fish, bird, invertebrate, mammal and reptile species as well as the sustenance of inshore and inlet habitat values.

Generally, the potential for aquaculture development in the offshore planning unit is limited due to the exposure and sensitivity of the area. However, there is one exception where moderate to high potential for finfish aquaculture development in isolated, most inland area of Unit 11 along the northeast portion of the planning unit. In the longer term, there is potential for offshore oil and gas development along the west coast of Vancouver Island.

Table 3. Habitat categories, associated physical features, ecological attributes and function for the Quatsino Coastal Plan Area.

Habitat Category	Sub units	Area (ha/% of total)	Exposure	Water Depth (m)	Water temp	Dominant substrate	Ecological Attributes and key habitat features	Ecological Function
Protected shallow inlet	1, 3	4615 / 3.3%	Low	20-50	Cold	Mud, sand, gravel	Estuaries, eel grass beds, tidal flats, small amount of canopy kelp beds	Rearing refuge habitat for all life stages of fish and invertebrate species. Refuge and rearing areas for marine and shoreline birds, herring spawn habitat, prime clam beaches. Seasonal utilization by mammals including pinnipeds, gray and minke whales, Orca and harbour porpoise.
Protected deep inlet	2, 4, 5, 6, 7, 8	19888/ 14%	low	50-200	50:50 warm/ cold	Mud with some rock	High current areas that increase nutrient availability and overall productivity, high proportion of gravel beaches and flats, estuaries, eelgrass beds, moderate amount of canopy kelp beds	Critical feeding areas and migration corridor for marine and shoreline birds and fish (incl. salmon, herring & pilchards). Existing clam beds, prime prawn and shrimp habitat, sea otter feeding habitat. Utilization by minke and gray whales, Orca and harbour porpoise.
Semi exposed shallow inlet	9, 13, 14	5107 / 3.6%	moderate	20-50	Warm	Rock, sand	Abundant sand beaches and sand flats, eel grass beds, lesser amount of estuaries, protected rocky shorelines with seaweed and kelp forests.	Highest value herring spawn habitat in the plan area, clam beaches, critical rearing and feeding habitat for marine and shoreline birds and all life stages of fish and inverts including crabs. Prime feeding habitat for gray whales. Utilization by minke whales, Orca and harbour porpoise. Broad use by sea otters for resting, rearing and feeding.
Exposed near shore	10, 12	31296 / 22.1%	High	0-50	Warm	Rock platforms, rock with sand beaches	Extensive canopy kelp beds, submerged rocky reefs and pinnacles, rocky islets, fringing reef habitat, widespread intertidal habitat, complex benthic structure, localized nutrient rich upwelling areas	Nesting and feeding grounds for marine and shoreline birds, highest concentration of Pinniped haul out sites, prime rockfish and ground fish habitat, rearing habitat for fish and invertebrates. Migration corridor and sensitive habitat for whales, Delphinids, Pinnipeds and Leatherback turtles. Broad utilization by sea otters for resting, rearing and foraging.
Exposed offshore	11,15	81011 / 57.1%	High	50 - 1000	Cold	Rock and sand	Rock reefs and sand substrates, coastal upwelling areas	Halibut habitat, migration corridor and habitat for salmonids, whales (incl. humpback, gray, minke), Delphinids, Pinnipeds, groundfish, marine and pelagic birds, leatherback turtles.

2.5 Defining Areas of Ecological Significance in the Quatsino Plan Area

At the current time, Fisheries and Oceans Canada (DFO) is in the process of developing criteria to define Areas of Ecological Significance (AES) within the Quatsino Plan Area. AES can be generally defined as geographic areas having the highest value ecological attributes within a planning unit or the Plan Area. To date, the following valued ecological attributes are being used as criteria to identify Areas of Ecological Significance.

- Biological Productivity – areas of high net export of productivity and processes
- Biodiversity – areas critical in promoting genetic, species and ecosystem/habitat diversity
- Reproductive Habitat – breeding, spawning and nesting areas
- Bottleneck/Seasonally Critical Habitat – areas where a particular species or groups of species concentrate and are dependant upon seasonally eg overwintering sites, migration routes
- Endangered/threatened species Habitat – species defined by COSEWIC
- Rare/Unique habitat for rare species – habitat utilized by species with limited ranges or habitat found in only a few locations

Other second order criteria being explored to define further AES and include areas of naturalness/integrity, habitat necessary for dependency/survival, fragile/sensitive areas, and areas that are representative of biogeoclimatic zones. Overtime, DFO will further develop criteria to identify AES within the Quatsino Sound Plan Area in order to manage development in a manner that will sustain valuable ecological attributes.

In addition to the AES, which may represent a complex of values, there are specific features that acknowledged to possess high habitat values. Development proposals for any of these areas are governed by established siting criteria and/or will be subject to greater scrutiny by reviewing agencies during the approval process. These areas include:

- estuaries
- salmon streams
- eelgrass beds
- native bivalve beds
- kelp forests
- areas of localized herring spawn
- salmon rearing and migration areas;

2.6 Biological Features

Following is a description of known key marine species including shellfish, finfish, sea otters, other marine mammals, marine reptiles and marine birds. For commercially harvestable species, their economic value since 1996 is also discussed. However, catch data for salmon has not been included as the commercial catch data for Statistical Area 27 includes interception of migrating stocks and in many cases only reflects a minor component of salmon stocks returning to the plan area.
The purpose of this section is to provide a brief overview of the known biological values typical to the Quatsino Plan Area. This information provides baseline information to document known information about the distribution and abundance (if available) of marine species within the Plan Area. Also included is a description of the location and timing of habitat types utilized by key fish species within the habitat categories outlined for the Quatsino Plan Area. This information can assist decision makers in

determining suitable marine development activities within the Plan Area. It is important to note that the ecological integrity of marine systems can also be largely affected by resource development activities such as logging and road construction on adjacent terrestrial areas, which is outside the context of this chapter.

Salmon and other Finfish

Salmon

There are at least 54 anadromous fish bearing streams within the Quatsino Plan Area (DFO 1990). Chum and coho are the primary species produced in Area 27, with major runs produced in Bear Creek, Cayeghle Creek, Colonial Creek, the Goodspeed River, Hathaway Creek, Stephens Creek, the San Joseph River, Klashkish River and the Marble River. Most streams in the plan area do not have accurate and complete escapement records and therefore it is difficult to determine whether a stock is increasing, decreasing or stable. In general, the DFO outlook for the west coast of Vancouver Island coho returns is for lower abundances due to reduced marine survival of smolts. Fishing restrictions have been successful at increasing juvenile coho abundance and escapements (DFO 2002b). However, ocean survival for coho remains low at less than 5% and remains lower than the longterm average (DFO 2002b). As well, predictions for west coast of Vancouver Island chum stocks is for a moderate to good survival trend, but due to medium to poor spawning in the 1999 brood year, average to below average returns in anticipated (DFO, 2003).

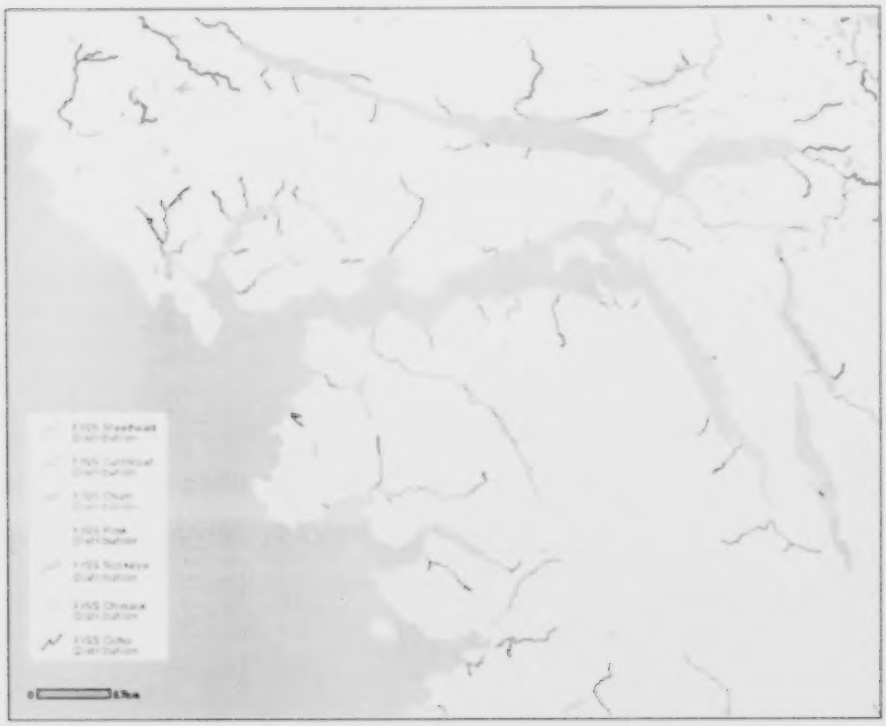

Figure 13. Salmonid Distribution Quatsino Sound.
Source: DFO and MSRM Fisheries information Summary System (FISS) displayed using Mapster
http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm

Smaller runs of chinook and pink salmon are produced in the Quatsino Plan Area. The largest chinook run is produced in the Marble River where historical chinook escapement to the Marble River has ranged from 40 to 7500 spawners, with a recent average return of approximately 2670 adults between 1998 and 2002 (DFO 2003). Another important chinook producing system is the Colonial/Cayeghle system. The Marble River and Colonial/Cayeghle systems are used as indicator streams for chinook in the Quatsino Subdistrict (Riddell et. al., 2002). The status of chinook stocks in the Quatsino Plan Area is

difficult to determine due to the lack of reliable, consistent escapement records. The overall outlook for the Westcoast of Vancouver Island chinook stocks anticipates poor predicted returns due to very low ocean survival (<1%) of smolt to age 2 chinook, based on poor returns of 3 year old fish from indicator stocks (DFO, 2002a). With low returns in some smaller chinook systems, there is a significant risk of stock extinction and a need to conserve wild spawners. The protection of critical rearing habitat including estuaries, eelgrass beds, kelp canopy habitat and protected shoreline areas is important to assist in the recovery of salmon stocks with conservation concerns in the Quatsino Plan Area.

Significant runs of sockeye were historically produced in the Mahatta R., Marble R, Klashkish R and Fisherman R, with smaller runs produced in the Cayeghle and Canoe creek systems. Recent sockeye escapement estimates are limited for the Quatsino Plan Area. In general terms, recent research has determined that marine growth and survival of WCVI sockeye are sensitive to variations in ocean climate conditions. Elevated ocean temperatures and low salinity indicate unfavorable marine conditions for sockeye juveniles (DFO 1999). When coastal conditions are relatively cool combined with high salinity waters, the ocean survival rate for sockeye can increase by 2-5 times. Since 1999, ocean conditions off the WCVI have been highly variable, and corresponding sockeye returns continue to exhibit extreme numeric fluctuations in those systems that are regularly enumerated (DFO 1999). The Quatsino First Nation has identified a conservation concern for Mahatta River sockeye, one of the few remaining sockeye stocks in their traditional territory. In 1992 and 1993, sockeye escapement in the Mahatta averaged 350 spawners with no escapement estimates documented by DFO since 1993. The Quatsino Nation has future plans to assist with stock recovery and eventually establish a food fishery from the Mahatta River system (D. Schmidt, pers. comm).

Salmon are produced throughout the Quatsino Plan area, with chum and pink fry entering the marine environment during the first spring after emergence. Chinook, coho and sockeye smolts generally outmigrate to the estuarine areas in the spring, after spending at least one year rearing in freshwater. Salmon fry and smolts generally disperse and rear in protected habitat, after which some species migrate to offshore areas to feed as sub adults for 2 to 4 years (Table 2). Spawning migration into inlet habitat within the Plan Area primarily occurs during the late summer and fall.

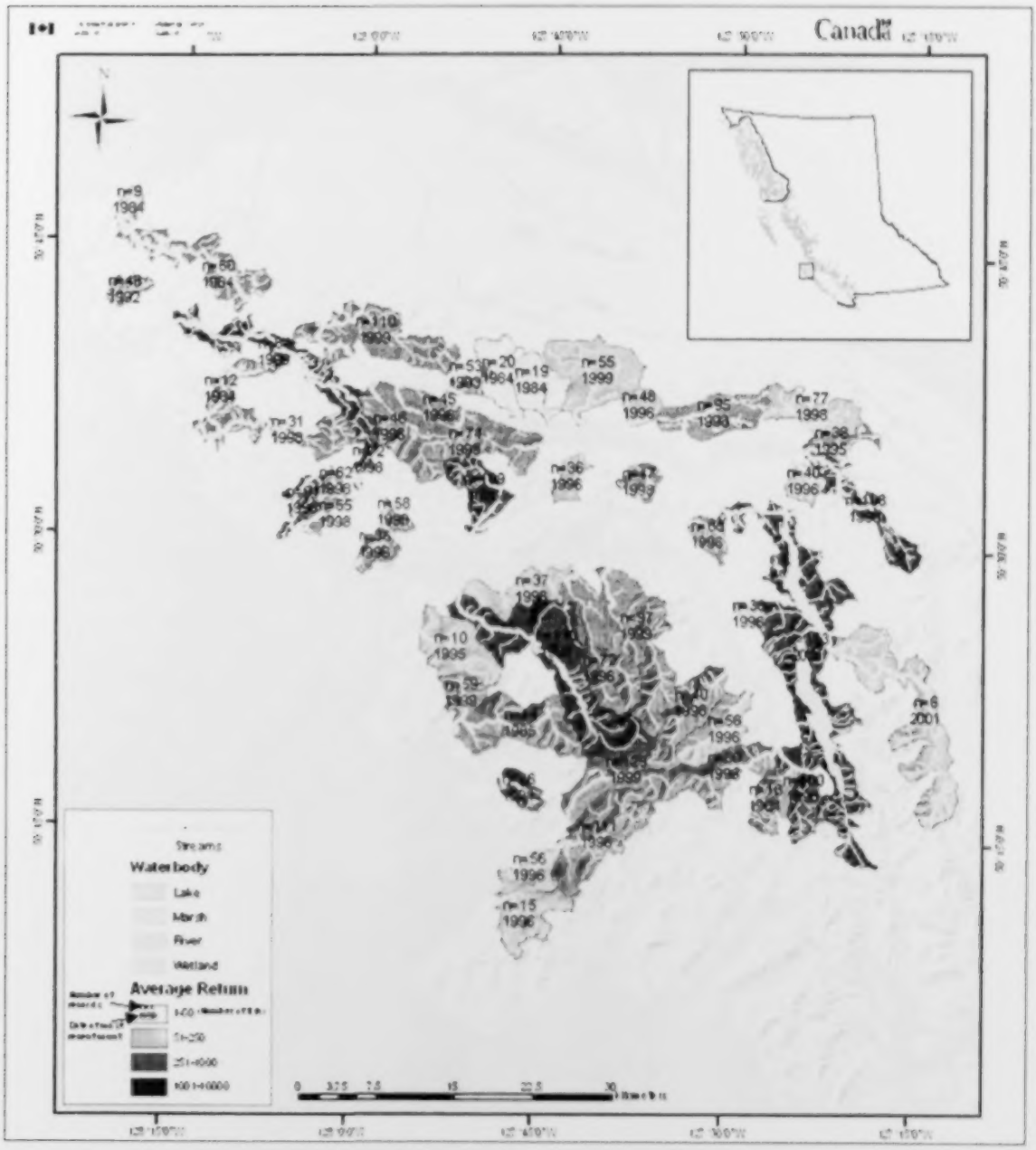

Figure 14. Average Annual Salmon Escapement in Quatsino Sound (1953-2001)
Summary Estimate Narrative database. Summary statistics were calculated by watershed code. Marble River drainage exhibits highest average return followed by San Josef and Klaskish River drainages. Source: DFO HEB GIS Group October 2003

Table 4.

Table 4. Utilization of the Habitat Categories outlined for the Quatsino Plan Area for salmon and selected groundfish species.

Species	Protected shallow Inlet	Protected Deep Inlet	Semi Exposed shallow inlet	Exposed near shore	Exposed Offshore
	PU: 1,3	PU: 2, 4-8	PU: 9,13,14	PU:10,12	PU: 11,15
Salmon					
Juveniles	Rearing smolts	Rearing smolts	Rearing smolts		
Adult	Spawning Migration (fall)			Sub adult marine phase (1-3 yrs)	
Groundfish					
Halibut				Pelagic Larvae Young adults	Pelagic Larvae
Lingcod		Planktonic larvae from March to June			
		Juvenile and adults on reef habitat in 5,6,8		All life stages	
Rockfish		Juvenile and adults on reef habitat in 5,6,8		Juvenile and adults on reef habitat	Juvenile and adults on reef habitat in PU 11and deepwater habitat in PU 15
Sole	Lower densities of selected sole species that prefer shallow waters likely produced			Primarily produced in deep waters within exposed off shore and near shore habitat	
Herring	Pelagic juveniles				
	Very small magnitude of herring spawning in PU 1,2,3,8 relative to Winter harbour (spring)		Large magnitude of herring spawn activity (spring)		

Note: this table illustrates general trends by species and variations will occur outside the seasonal timing windows listed above.

spring		summer		fall		winter		all	

Groundfish

Key groundfish species in the Plan Area typically inhabit shallow waters and marine shelves and include halibut (Hippoglossus stenolepis), lingcod (Ophiodon elongatus), rockfish (Sebastes sp) and flatfish (sole). Ground fish species are important for commercial, recreational and First Nation food fisheries. In general, since 1989, ecosystem data for the west coast of Vancouver Island has indicated average to below average year classes of several ground fish species (DFO, 2001). Therefore, a conservative harvest is anticipated for future years. Important ground fish production areas are located on the continental shelf offshore of Quatsino Sound. Areas at the entrance to the Sound and in Brooks Bay are also important to commercial, sports and First Nations harvesters.

Rockfish are distributed throughout the Quatsino Plan area, residing on shallow rocky reefs and rock pinnacles common to exposed near shore habitat in the San Joseph/Perkins and Southern Approaches

Figure 14. Average Annual Salmon Escapement in Quatsino Sound (1953-2001)
Summary Estimate Narrative database. Summary statistics were calculated by watershed code. Marble River drainage exhibits highest average return followed by San Josef and Klaskish River drainages. Source: DFO IHB GIS Group October 2003.

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Salmon					
Juveniles	Rearing smolts	Rearing smolts	Rearing smolts		
Adult	Spawning Migration (fall)			Sub adult marine phase (1-3 yrs)	
Groundfish					
Halibut				Pelagic / Larvae	Pelagic / Larvae
				Young adults	
Lingcod		Planktonic larvae from March to June			
		Juvenile and adults on reef habitat in 5,6,8		All life stages	
Rockfish		Juvenile and adults on reef habitat in 5,6,8		Juvenile and adults on reef habitat	Juvenile and adults on reef habitat in PU 11and deepwater habitat in PU 15
Sole	Lower densities of selected sole species that prefer shallow waters likely produced			Primarily produced in deep waters within exposed off shore and near shore habitat	
Herring	Pelagic juveniles				
	Very small magnitude of herring spawning in PU 1,2,3,8 relative to Winter harbour (spring)		Large magnitude of herring spawn activity (spring)		

Note: this table illustrates general trends by species and variations will occur outside the seasonal timing windows listed above

spring		summer		fall		winter		all	

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Key groundfish species in the Plan Area typically inhabit shallow waters and marine shelves and include halibut (Hippoglossus stenolepis), lingcod (Ophiodon elongatus), rockfish (Sebastes sp) and flatfish (sole). Ground fish species are important for commercial, recreational and First Nation food fisheries. In general, since 1989, ecosystem data for the west coast of Vancouver Island has indicated average to below average year classes of several ground fish species (DFO, 2001). Therefore, a conservative harvest is anticipated for future years. Important ground fish production areas are located on the continental shelf offshore of Quatsino Sound. Areas at the entrance to the Sound and in Brooks Bay are also important to commercial, sports and First Nations harvesters.

Rockfish are distributed throughout the Quatsino Plan area, residing on shallow rocky reefs and rock pinnacles common to exposed near shore habitat in the San Joseph Perkins and Southern Approaches

planning units as well as rock reefs located in Quatsino Entrance, Koprino, Quatsino and Buckholz-Neroutsos planning units (Table 2). At least 11 rockfish species are commercially harvested in the plan area off shallower rocky reefs by the hook and line fishery. According to available 2002 catch data, a total of 4,700 pounds of rockfish was harvested from Area 27 through this fishery (DFO 2003). In 2002, Copper rockfish (Sebastes caurinus) was the most abundant species comprising 31% of the total catch, with China rockfish (Sebastes nebulosus) and Yelloweye rockfish (Sebastes ruberrimus), each contributing a total of 20% to the commercial fishery (DFO 2003).

Rockfish also inhabit deeper offshore waters, where some species live in schools near the bottom to depths up to 366 m (DFO 2003, Hart 1973). A significantly larger proportion of rockfish are captured by the trawl fishery in comparison to the near shore hook and line fishery. The commercial trawl fishery harvests at least 27 rockfish species in the Quatsino Approaches Planning Unit. Between 1996 and 2002, the annual harvest of rockfish from the trawl fishery ranged from 22,000 to 71,000 pounds, with an average annual harvest of 44,100 pounds since 1996. The primary species captured was the Silvergrey rockfish (44%), followed by the Yellowtail (15%), Canary (14%) and Widow rockfish species (7%) (DFO 2003). Declining rockfish stocks have resulted in announcement of a DFO rockfish conservation strategy, where rockfish conservation areas have been established north of Topknot Point and offshore of the Brooks Peninsula.

The majority of lingcod are distributed in near shore areas and deep protected inlet habitat including San Joseph/Perkins, Southern Approaches, Quatsino Approaches, Quatsino Entrance, Quatsino, Koprino and Buckholz-Neroutsos planning units. For the most part, lingcod inhabit water depths ranging from 10 to 100 m (DFO 2001). Lingcod are largely non-migratory and live up to 20 years. First age of reproduction is 3-5 years (70-76 cm) for females and 2 years (46-51 cm) for males, with spawning activity taking place from December to March in shallow water (Hart 1973)(Table 2). The males guard the nest and fan the eggs until they hatch in March/April with larvae remaining pelagic until late May/early June (DFO 2001). The juveniles settle in shallow, flat rock bottom habitat and move to deeper waters as they mature. The abundance of lingcod off the west coast of Vancouver Island remains at a moderate level with little change to harvest levels (DFO, 2001). Lingcod are commercially harvested primarily by the trawl fishery but are also captured through the hook and line fishery along with rockfish. Since 1996, the lingcod harvest has been variable through the trawl fishery, ranging from 3800 to 51,600 pounds, with an average annual harvest of 24,900 pounds since 2002 (DFO 2003). The highest harvest rate for lingcod since 1996 occurred in 2002, where a total of 51,600 pounds of lingcod was captured in the trawl fishery and an additional 1550 pounds harvested through the hook and line fishery (DFO 2003).

The Quatsino Sound Plan Area supports important herring stocks. Herring generally spawn in March at water depth ranging between high tide and 11 m deep. The eggs are deposited on shoreline vegetation, rocks, and wood and hatch in approximately 10 days. Larvae are pelagic and survival rates are significantly higher if the larvae remain in protected near shore habitat. After their first fall, juvenile herring migrate to deeper offshore waters (Hart 1973) (Table 2). Herring mature at 3 or 4 years and migrate inshore the fall in preparation to spawn in the spring (Hart 1973). Herring are a commercially important species and the single most important herring spawn habitat is located in Winter Harbour (ref: herring spawn data compiled by LGL). Approximately 60% of the total herring spawn observed within the Plan Area is located in the Winter Harbour area. Other important herring spawn habitat is located in Klaskish Inlet (representing 22% of the total linear length within the Plan Area) and Klaskino (12%) Inlets. (LGL ref). Herring spawn areas that are relatively smaller in magnitude in comparison to Winter Harbour, Klaskino and Klaskish are located in Upper and Lower Holberg Inlets, Coal Harbour, Hathaway Creek in Rupert Inlet, Forward Inlet. Between 1996 and 2002, the roe on kelp fishery harvested between

43,000 and 99,000 pounds of roe on kelp, generating between $550,000 to 2.9 million annually between 1996 (DFO 2003).

Between November to January, Pacific habitat spawn in deep offshore waters (275 to 400 m) outside the Quatsino Plan Area (Hart 1973). First age of reproduction in females ranges between 8-12 years and females can produce 2 to 3 million eggs each year, that are released into the water column (free-spawning). The eggs and larvae are pelagic for 4-5 months and typically live at depths of 100-200 meters. The larvae are eventually carried inshore by surface currents and settle onto sand/gravel substrates at approximately 6-7 month of age (Hart 1973). As the juveniles mature, they migrate to deeper water, with adults living most commonly at depths between 55 and 422 m (Hart 1973). Halibut are a commercially important species harvested within the Quatsino Plan Area. Since 1996, the total annual halibut harvest has ranged between 61- to 4800 pounds, with an average annual catch of 2100 pounds (DFO 2003). Halibut also make a significant contribution to the sport and First Nations fisheries.

There are at least 14 sole/flounder species produced in the Quatsino Plan area. Sole species spawn in late winter/early spring, releasing eggs into the water. Pelagic larvae can be found between the surface and 200 m (Hart 1973). Commercial catch in the Quatsino Plan area occurs through the trawl fishery and since 1996, the annual catch has varied between 19,000 to 64,000 pounds (DFO 2003). The Arrowtooth flounder is the dominant (73%) flatfish species captured by the trawl fishery, with Dover sole (7%) and Rock sole (9%) being the next most abundant species harvested (DFO 2003). Commercial catch data confirms utilization of the exposed offshore habitat, with juveniles and smaller relative proportion of adults utilizing the exposed near shore as well as sandy substrates within the protected inlet habitat.

Shellfish and Invertebrates

The Quatsino Plan Area contains a variety of shellfish and invertebrate species including prawns/shrimp, geoduck, crabs, clams, oysters and sea urchins, that are harvested for commercial, recreational and First Nations use.

Prawns and shrimp

Several species of shrimp are found in Plan Area waters and generally inhabit rocky bottom habitat, although some species range throughout the water column. Prawns (Pandalus hypsinotus) are the largest and most commercially lucrative of the Pacific coast shrimp species. They are primarily bottom dwellers, and prefer sloped, rocky substrates between 75 and 150 meters. Mature shrimps breed in the late autumn to early winter. Developing eggs are carried on the swimmerets of female shrimp until hatching in the spring. The newly hatched "zoea" larvae metamorphose through a number of stages and swim freely as zooplankton for approximately 3 months before settling to the bottom to mature further (Morris et al 1980) (Table 3).

Prawns are harvested in Holberg and Neroutsos Inlets, along the main Quatsino Sound stem from Drake Island to Koprino, and at Klaskino Inlet. They are harvested recreationally by traps, and in the commercial fishery by both otter trawl gear and deep water traps. The annual value of the prawn fishery ranged from $96,000 to $431,000 between 1996 and 2002, generating an average annual revenue of $298,000. Shrimp are harvested on the continental shelf, south of the Quatsino Sound entrance and generated average annual revenues of $96,000 between 1996 to 1998 and 2002. A small commercial harvest for octopus (likely a bycatch from the prawn/shrimp fishery) has generated average annual revenues of $6,100 since 1996 (DFO 2003).

Table 5. Seasonal utilization of habitat categories outlined for the Quatsino Plan Area by shellfish species.

Species	Protected shallow Inlet	Protected Deep Inlet	Semi Exposed shallow inlet	Exposed nearshore	Exposed Offshore
	PU: 1,3	PU: 2, 4-8	PU: 9,13,14	PU:10,12	PU: 11,15
Prawns/shrimp	Free swimming larvae during spring and summer	Free swimming larvae during spring and summer			
	Bottom dwelling adults present year round in PU 2,5-8 and 13.				
Geoduck		Resident to semi exposed with soft substrates in PU 8	Resident to semi exposed with soft substrates	Spawn in June/July	
				Resident to semi exposed with soft substrates	
Crabs	Crabs in suitable habitat, typically less than 90 m in PU 1,2, 4, 6-8		Crabs produced in Klashkish and Winter Harbour	Crabs produced in Side Bay, Brooks Bay in PU 12	
	5 planktonic zoeal stages in upper 20 m of water column				
Clams	Free swimming larvae April to Sept	Free swimming larvae April to Sept			
	Adults in coarse sand/mud/gravel substrates in protected or semi protected middle to low intertidal areas				
Sea urchins		Spawn in late winter/early spring			
		Adults typically inhabit the lower intertidal and shallow subtidal zones on rocky shores with moderate to high wave action			

Note: this table illustrates general trends by species and variations will occur outside the seasonal timing windows listed above

spring		summer		fall		winter		all

Crabs

The predominant commercial crab species in the Plan Area is the Dungeness crab (Cancer magister) with adults found to depths of 180 meters but are most abundant in water less than 90 m (Morris et. al., 1980). Dungeness are most abundant in areas with sandy substrates and/or shallow waters with eelgrass (Jamieson, 2002). Adults mate between April to September, and females can store sperm for several months. Most females carry eggs from November through February, and eggs hatch and larvae progress through 5 pelagic zoeal stages over the next 3 to 5 months (Morris et. al., 1980) (Table 3). Like many other invertebrate species, their larval life stage is spent as zooplankton within the upper 20 m of the water column, thereby providing an important food source to herring, pilchards and salmon. Metamorphosis of the larvae into their adult form occurs in the spring and crabs are sexually mature in 1.5 years.

Dungeness crab are usually fished by trap and are highly valued for commercial fishery as well as recreational and First Nation fishery purposes. Crab are harvested in Brooks Bay, Klaskish Inlet, Side Bay, Winter Harbour, Mahatta River, Koprino, Neurotsos Inlet, Marble River, Rupert Inlet and parts of Holberg Inlet (Table 2). Within Area 27, the value of the commercial crab fishery has averaged $238,000

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	5 planktonic zoeal stages in upper 20 m of water column				
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annually since 1996, with the commercial crab fishery increasing over the last 2 years to generate an annual average revenue of $389,000 in 2001 and 2002 (DFO 2003). A small commercial fishery for tanner crabs occurred in 2000, generating $1,300 in revenue.

Geoduck Clams

The geoduck clam (Panope abrupta) is the largest bivalve found in British Columbia, occupying habitat from the lower intertidal zone to depths of over 100 meters DFO (2000). They are among the longest-lived animals in the world, with ageing analysis revealing individuals that are more than 100 years old (DFO 2000). Geoduck are produced within the plan area in semi exposed habitat, beneath sand, silt, gravel and other soft substrates in exposed nearshore, semi exposed shallow inlet habitat and protected deep inlet habitat within the Quatsino Plan Area. Spawning takes place in June and July, where females release 7-10 million eggs into the water column.

Geoduck clams spend the first 40 to 50 days of their lives as free-swimming larvae before undergoing metamorphosis to a young adult form that typically recruits to substrate previously colonized by more mature clams. Maximum growth rates are generally observed in the first 10 to 15 years (DFO 2000).

Geoduck recruit to the commercial fishery between 4 and 12 years. In 2001, the geoduck harvest generated 43.8 million dollars in B.C., representing the greatest value of all commercially harvested seafood species within B.C. (Morrison, 2003). Similarly, in the Quatsino Area, geoduck generated the highest total revenue of all commercially harvested shellfish species in 1998 (over $2.8 million) (DFO 2003), with the majority of benefits going to non-local residents. Geoduck are harvested commercially within the Plan Area, with the fishery currently managed by DFO as a 3-year rotational fishery (2002). Within Area 27, a smaller fishery in the off 2 years is evident by the catch records. Since 1996, the geoduck fishery has been open for 5 out the 7 years, and in those years generated revenues less than $16,000 in 1996 and 1997, 2.8 million in 1998 and an average revenue of $376,000 over 2001 and 2002 (DFO 2003).

Littleneck and Manila Clams

Intertidal clams within the Plan Area include the native littleneck clam (Protothaca staminea) and introduced manila clam (Tapes philipinarum). Clams release gametes into the water column from April to September and the larvae settle and young clams burrow into the substrate (Morris et. al., 1980). Littleneck clams can grow to approximately 30 mm in 3 years off the BC coast (Morris et. al., 1980).

Clam beaches are spread throughout the Plan Area, but are most abundant where mixed substrates of gravel, sand, mud and shells are found in the middle and low intertidal zones of protected shoreline areas and estuaries (Table 3). Sizeable clam harvesting areas are located in Hecate Cove, Waakwaas Creek estuary, Utah Mines Bay, Klootchlimmis Creek, Atkins Cove, Colonial/Cayeghle estuary, Thurburn Bay and the Koprino River estuary (Table 3). Clams also occur in smaller but significant sites across the study area. Clams are an important resource to First Nations people and to date, commercial clam harvesting in the Plan Area has been minimal in comparison to the south west coast of Vancouver Island. Catch records indicate the manila clam fishery to be worth an annual average of $1,050 in 1997 and 1998, with no further catch records listed (DFO 2003). Both the Blue mussel (Mytilus edulis) and California mussel (Mytilus californianus) are abundant in the near shore habitats of the Plan Area, but are not harvested commercially at present.

Sea Urchins

All 3 species of sea urchins: red (Strongylocentrotus franciscanus), green (S. droebachiensis) and purple (S. purpuratus) are represented in the Plan Area. The purple urchin is most common and typically inhabits the lower intertidal and shallow subtidal zones on rocky shore in area of moderate to strong wave action

(Morris et. al., 1980). Urchins graze on attached or drift seaweed and kelp and have a specialized jaw consisting of five articulating teeth that allow them to reduce plant material. Urchins are often found in aggregations and their combined feeding efforts have been known to remove large quantities of kelp beds. Urchins typically spawn between January and March, during their second year when they reach 25 mm in diameter. The planktonic larval stage lasts between 2 to 4 months (Morris et. al., 1980).

Commercial harvesting of urchins occurs in Quatsino Sound near the Mahatta River and the Narrows, Winter Harbour, Quatsino Entrance and the Southern Approaches planning unit (Table 3). In the Quatsino Plan area, annual revenues generated from commercial red sea urchin harvesting has steadily declined from $135,000 in 1996 down to $3,100 in 2002 (DFO 2003).

Sea Cucumbers

There are a number of sea cucumber species in the Quatsino Sound area, although the giant red (California) sea cucumber (Parasitichopus californicus) is the largest and the only one commercially harvested. It is found throughout nearshore waters from the intertidal zone to 250 meters, on a variety of substrate and current conditions. Sea cucumbers spawn between June and August by way of broadcast fertilization. Eggs are fertilized in the water column and larvae exist as zooplankton for a period of approximately 70 days before recruitment. Juvenile sea cucumbers typically attain sexual maturity within 5 years. Sea cucumbers are harvested by divers, usually during autumn and winter, and have been a historically important food resource to First Nations. Commercial harvesting in the Plan Area is presently limited by DFO due to lack of conservation information. The last sea cucumber harvest in the Plan Area took place in 1996 when the annual fishery generated $53,000 with harvesting taking place in Quatsino Sound and Winter Harbour (DFO, 2003).

Birds

Quatsino Sound is rich in bird life. The diverse marine biodiversity driven by offshore nutrient upwelling supports significant seabird colonies while the extensive estuaries and mudflats provide ideal feeding grounds for migratory and resident bird species. Nearly 50% of the 5.7 million marine birds that breed in British Columbia nest on islands off the west coast of Vancouver Island. All thirteen species of marine birds are represented in the Quatsino Coastal Plan Area including major seabird breeding colonies and feeding areas for resident and migratory birds. Migrating birds utilize the Plan Area for rest or feeding en route, usually in the fall and spring and often coinciding with major seasonal events such as the Pacific herring (Clupea harengus pallasi) spawning activity. For management purposes, marine bird species require continued access to sheltered waterways and food sources, most commonly in estuaries and marshes. It is well documented that estuaries and mudflats, particularly those that support significant beds of eelgrass (Zostera spp.) are amongst the most critical feeding habitats of marine and shoreline birds (Phillips, 1984). Studies on the east coast of Vancouver Island have shown that development impacts to estuaries can significantly reduce marine bird productivity (Campbell Prentice and Boyd, 1988).

Longer-term and resident marine bird species have greater management requirements including protection of specific breeding areas, and controls over human use, activity or disturbance at critical times of the year. Breeding season in the Plan Area typically occurs between April and August. The loss of nesting, feeding and roosting habitats represent the greatest potential threat to marine and shoreline bird populations on the west coast of Vancouver Island (Morgan et. al., 1992). The Canadian Wildlife Service (CWS) of Environment Canada has identified areas of interest, concern, and significant bird colonies in the Plan Area (Table 7). Sensitive sites including annually monitored breeding sites are recognized by the CWS as globally significant Important Bird Areas Sites (IBAs). Planning units 11, 12, 13 & 14 contain the highest concentration of marine bird nesting sites including Rowley Reefs, Gillam Islands, Newton

Entrance, Klaskino and Klashkish Inlets to Guilliams Bay, Rugged Island, Gould Rock, Hacket and Guilliams Islands, Clerke and Solander Island. Valuable marsh and estuary habitat used extensively by migratory and resident bird species can be found within coves and inlets located in planning units 1, 4, 5, 7, 8 & 9.

Table 6. Utilization and timing of the Habitat Categories outlined for the Quatsino Plan Area by Marine Birds

Species	Habitat Categories and Planning Units				
	Protected shallow Inlet (1,3)	Protected Deep Inlet (2, 4-8)	Semi Exposed shallow inlet (9,13,14)	Exposed nearshore (10,12)	Exposed Offshore (11,15)
Gull-like birds (Jaegers, Gulls)			breeding	breeding	breeding breeding
Waterfowl (Swans, Geese, Ducks)					
Wading birds (Herons)					
Diving Birds (Cormorants, Loons, Grebes)				breeding breeding	breeding breeding
Alcids (Puffins, Auklets, Murrelets, Murres, Guillemots)				breeding breeding	breeding breeding
Shorebirds (Oystercatchers, Plovers, Sandpipers, Kingfishers)				breeding	breeding breeding
Seabirds (Shearwaters, Petrels, Albatross)				breeding breeding	breeding breeding
Birds of prey (Eagles, Ospreys, Falcons)					

Adapted from CWS, 2002 Note: this table illustrates general trends by species and intraspecies variations will occur outside the seasonal timing windows.

spring | summer | fall | winter | all

Entrance, Klaskino and Klashkish Inlets to Guilliams Bay, Rugged Island, Gould Rock, Hacket and Guilliams Islands, Clerke and Solander Island. Valuable marsh and estuary habitat used extensively by migratory and resident bird species can be found within coves and inlets located in planning units 1, 4, 5, 7, 8 & 9.

Table 6. Utilization and timing of the Habitat Categories outlined for the Quatsino Plan Area by Marine Birds

Species	Habitat Categories and Planning Units				
	Protected shallow Inlet (1,3)	Protected Deep Inlet (2, 4-8)	Semi Exposed shallow inlet (9,13,14)	Exposed nearshore (10,12)	Exposed Offshore (11,15)
Gull-like birds (Jaegers, Gulls)			breeding	breeding	breeding breeding
Waterfowl (Swans, Geese, Ducks)					
Wading birds (Herons)					
Diving Birds (Cormorants, Loons, Grebes)				breeding breeding	breeding breeding
Alcids (Puffins, Auklets, Murrelets, Murres, Guillemots)				breeding breeding	breeding breeding
Shorebirds (Oystercatchers, Plovers, Sandpipers, Kingfishers)				breeding	breeding breeding
Seabirds (Shearwaters, Petrels, Albatross)				breeding breeding	breeding breeding
Birds of prey (Eagles, Ospreys, Falcons)					

Adapted from CWS, 2002 Note: this table illustrates general trends by species and intraspecies variations will occur outside the seasonal timing windows.

spring		summer		fall		winter		all	

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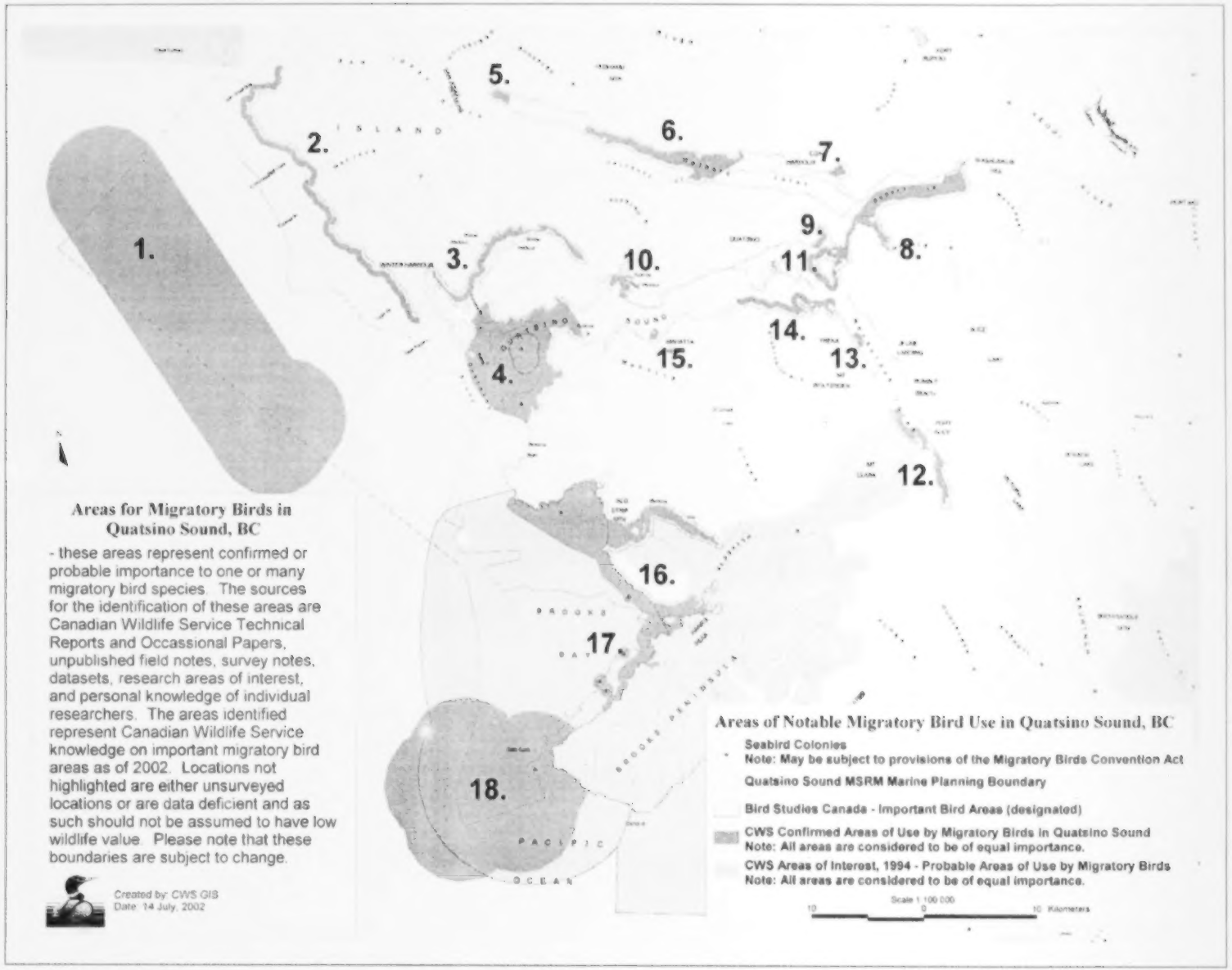
Areas for Migratory Birds in Quatsino Sound, BC
- these areas represent confirmed or probable importance to one or many migratory bird species. The sources for the identification of these areas are Canadian Wildlife Service Technical Reports and Occassional Papers, unpublished field notes, survey notes, datasets, research areas of interest, and personal knowledge of individual researchers. The areas identified represent Canadian Wildlife Service knowledge on important migratory bird areas as of 2002. Locations not highlighted are either unsurveyed locations or are data deficient and as such should not be assumed to have low wildlife value. Please note that these boundaries are subject to change.
Areas of Notable Migratory Bird Use in Quatsino Sound, BC
Seabird Colonies
Note: May be subject to provisions of the Migratory Birds Convention Act
Quatsino Sound MSRM Marine Planning Boundary
Bird Studies Canada - Important Bird Areas (designated)
CWS Confirmed Areas of Use by Migratory Birds in Quatsino Sound
Note: All areas are considered to be of equal importance.
CWS Areas of Interest, 1994 - Probable Areas of Use by Migratory Birds
Note: All areas are considered to be of equal importance.

Figure 15 Areas of Migratory Bird Use Refer to table 7 for additional details Source: Canadian Wildlife Service 2003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Areas for Migratory Birds in Quatsino Sound, BC
- these areas represent confirmed or probable importance to one or many migratory bird species. The sources for the identification of these areas are Canadian Wildlife Service Technical Reports and Occassional Papers, unpublished field notes, survey notes, datasets, research areas of interest, and personal knowledge of individual researchers. The areas identified represent Canadian Wildlife Service knowledge on important migratory bird areas as of 2002. Locations not highlighted are either unsurveyed locations or are data deficient and as such should not be assumed to have low wildlife value. Please note that these boundaries are subject to change.
Created by: CWS GIS
Date: 14 July, 2002
Areas of Notable Migratory Bird Use in Quatsino Sound, BC
Seabird Colonies
Note: May be subject to provisions of the Migratory Birds Convention Act
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Note: All areas are considered to be of equal importance.
CWS Areas of Interest, 1994 - Probable Areas of Use by Migratory Birds
Note: All areas are considered to be of equal importance.
Scale 1:100,000
10 0 10 Kilometers

Figure 15. Areas of Migratory Bird Use Refer to table 7 for additional details Source: Canadian Wildlife Service 2003

Table 7. Areas of Notable Migratory Bird Use

Location (Planning Unit)	**Known Season(s) of Importance**	**Species Groups (B: Breeding Site)**	**Listed Species (R: Red/B: Blue)1**	**Fig. 13 Ref.**
Goodspeed Estuary (1)	Year round	Gulls, Dabbling and Diving Ducks, Loons, Swans, Geese	Trumpeter Swan (B), Canada Geese (B)	5
Clesklagh Creek to Weakfish Creek (1)	Fall & Winter	Gulls, Dabbling and Diving Ducks, Geese, Swans	Surf Scoter (B), Trumpeter Swan (B) Canada Geese (B)	6
Coal Harbour (3)	Winter	Gulls, Dabbling Ducks		7
Rupert Inlet to Atkins Cove (4, 5,6)	Winter through Summer	Dabbling and Diving Ducks, Gulls, Grebes, Loons, Alcids, Eagles, Herons, Swans, Geese	Western Grebe (R), Marbled Murrelet (R), Surf Scoter (B), Great Blue Heron (R), Trumpeter Swan (R), Canada Geese (R)	8
Hecate Cove (5)	Fall & Winter	Grebes, Gulls, Diving Ducks	Western Grebe (R)	9
Pamphlet Cove (5)	Spring	Mergansers		11
Teeta Creek to head of Neroutsos Inlet (7)	Fall through Spring	Diving and Dabbling Ducks, Gulls, Swans	Surf Scoter (B) Trumpeter Swans (B)	12
Coqueis Creek (6)	Spring	Eagles		13
Pender Point to Kewquodie Creek (6)	Fall & Winter	Dabbling Ducks, Gulls, Herons	Great Blue Heron (Blue)	14
Mahatta River (8)	Summer	Gulls		15
Koprino Harbour (8)	Winter & Spring	Dabbling and Diving Ducks, Geese, Shorebirds	Canada Geese (B)	10
Forward, Browning, Ahwichaolto Inlets, Winter Harbour(9)	Year-round	Swans, Dabbling and Diving Ducks, Mergansers, Grebes, Eagles, Loons, Alcids	Trumpeter Swan (B), Western Grebe(R), Marbled Murrelets (R), Surf Scoter (B)	3
San Josef Bay to Libby Point (10)	Fall through Spring	Dabbling Ducks, Cormorants, Alcids, Swans	Pelagic Cormorant (R), Double Crested Cormorant (R), Brandt's Cormorant (R), Common Murre (R, Tufted Puffin (B), Trumpeter Swan (B)	2
Rowley Reefs and Gillam Islands (11)	Spring through Fall	Strom Petrels (B: Fork-tailed and Leach's), Gulls (B; Glaucous-winged), Cormorants (B: Pelagic), Alcids (B: Pigeon Guillemot, Tufted Puffin, Shorebirds (B: Black Oystercatcher)	Pelagic Cormorants (R), Tufted Puffins (B)	4
Newton Entrance, Klaskino, Klaskish Inlets, Gilliam's Bay, Rugged Island, Gould Rock, Hackett and Gilliam's Islands (12, 13, 14)	Year round	Gulls (B; Glaucous Winged), Shorebirds (B: Black Oystercatcher), Alcids (B: Pigeon Guillemot), Diving Ducks, Grebes, Loons, Mergansers, Cormorants	Marbled Murrelets (R), Common Murre (R), Western Grebe (R), Surf Scoter (B), Pelagic Cormorant (R), Double Crested Cormorants (R), Brandt's Cormorant (R)	16

[1] Note Red listed species are those indigenous species that are identified as or are candidates for Extirpated, Endangered, or Threatened status in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Blue listed species are considered vulnerable and are of special concern because of characteristics that make them particularly sensitive to human activities or natural events.

Location (Planning Unit)	Known Season(s) of Importance	Species Groups (B: Breeding Site)	Listed Species (R: Red/B: Blue)1	Fig. 13 Ref.
Clerke Island (Brooks Peninsula adjacent 12)	Summer	Gulls	Gulls (B: Glaucous-winged), Shorebirds (B: Black Oystercatcher), Alcids (B: Pigeon Guillemots)	17
Quinn Rock (15)	Summer	Shearwaters, Albatross, Alcids	Ancient Murrelets (B), Cassin's Auklets (B), Tufted Puffin (B)	1
Solander Island (Brooks Peninsula immediately adjacent 15)	Spring, Summer	Storm Petrels (B: Fork-tailed and Leach's), Gulls (B: Glaucous-winged), Cormorants (B: Pelagic), Alcids (B: Common Murre, Cassin's Auklets, Tufted & Horned Puffins, Pigeon Guillemots) Albatross, Shearwaters	Pelagic Cormorants (R), Common Murre (R) Cassin's Auklets (B), Tufted Puffin (B) Ancient Murrelets (B)	18

Source CWS 2002

Marine Mammals

Table 8. Seasonal utilization of the habitat categories outlined for the Quatsino Plan Area by Marine Mammals and Marine Reptiles.

Species	Habitat Categories and Planning Units									
	Protected shallow Inlet (1,3)		Protected Deep Inlet (2, 4-8)		Semi Exposed shallow inlet (9,13,14)		Exposed nearshore (10,12)		Exposed Offshore (11,15)	
Gray whale	Migrants	Migrants	Migrants	Migrants	Residents		Residents		Residents	
Humpback whale										
Minke whale	Observed year round in low abundance									
Orcas (Resident, Transient & Offshore)	Seasonal distribution of resident Orcas				corresponding to migrating salmon					
	Transient Orca distribution corresponding to year-round presence of prey mammal species									
Other Delphinids (porpoises & dolphins)	Harbour porpoises		Harbour porpoises		Dolphins		Dall's porpoises & Dolphins		Dall's porpoises	
Pinnipeds (sea lions & seals)	Seals commonly observed around estuaries, fringing reef habitat, islands, sandbars						Haul-out sites on Rowley Reefs, Brooks Bay and Solander		Primary utilization around Gillam Islands	
Sea otters			Koprino & adjacent to Drake Isl. in Quatsino Buckholz-Neroutsos PU's		Commonly observed around Winter Harbour		Primary utilization in Rowley Reefs, Brooks Bay and Solander			
Leatherback turtle							Feeding migrants	Feeding migrants	Feeding migrants	Feeding migrants

Note: this table illustrates general trends by species and intraspecies variations will occur outside the seasonal timing windows.

Location (Planning Unit)	Known Season(s) of Importance	Species Groups (B: Breeding Site)	Listed Species (R: Red/B: Blue)1	Fig. 13 Ref.
Clerke Island (Brooks Peninsula adjacent 12)	Summer	Gulls	Gulls (B: Glaucous-winged), Shorebirds (B: Black Oystercatcher), Alcids (B: Pigeon Guillemots)	17
Quinn Rock (15)	Summer	Shearwaters, Albatross, Alcids	Ancient Murrelets (B), Cassin's Auklets (B), Tufted Puffin (B)	1
Solander Island (Brooks Peninsula immediately adjacent 15)	Spring, Summer	Storm Petrels (B: Fork-tailed and Leach's), Gulls (B: Glaucous-winged), Cormorants (B: Pelagic), Alcids (B: Common Murre, Cassin's Auklets, Tufted & Horned Puffins, Pigeon Guillemots) Albatross, Shearwaters	Pelagic Cormorants (R), Common Murre (R) Cassin's Auklets (B), Tufted Puffin (B) Ancient Murrelets (B)	18

Source CWS 2002

Marine Mammals

Table 8. Seasonal utilization of the habitat categories outlined for the Quatsino Plan Area by Marine Mammals and Marine Reptiles.

Species	Habitat Categories and Planning Units									
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Gray whale	Migrants	Migrants	Migrants	Migrants	Residents		Residents		Residents	
Humpback whale										
Minke whale	Observed year round in low abundance									
Orcas (Resident, Transient & Offshore)	Seasonal distribution of resident Orcas				corresponding to migrating salmon					
	Transient Orca distribution corresponding to year-round presence of prey mammal species									
Other Delphinids (porpoises & dolphins)	Harbour porpoises		Harbour porpoises		Dolphins		Dall's porpoises & Dolphins		Dall's porpoises	
Pinnipeds (sea lions & seals)	Seals commonly observed around estuaries, fringing reef habitat, islands, sandbars						Haul-out sites on Rowley Reefs, Brooks Bay and Solander		Primary utilization around Gillam Islands	
Sea otters			Koprino & adjacent to Drake Isl. in Quatsino Buckholz-Neroutsos PU's		Commonly observed around Winter Harbour		Primary utilization in Rowley Reefs, Brooks Bay and Solander			
Leatherback turtle							Feeding migrants	Feeding migrants	Feeding migrants	Feeding migrants

Note: this table illustrates general trends by species and intraspecies variations will occur outside the seasonal timing windows.

spring		summer		fall		winter		all	

Whales

The blue listed Gray whale (Eschrichtius robustus) utilizes the Quatsino Coastal Plan Area. Gray whales are the only living representative of the Family Escrichtidae and grow to a maximum length of 15 meters (Elder, 2001). Though they occasionally feed on schooling fish or swarming crustaceans, sediment dwelling amphipods comprise the bulk of their diet. Gray whales seasonally migrate through the Plan Area during the fall and spring feeding in shallow mud bottom habitat. Each October, pregnant female Gray whales well into their 12-month gestation, begin their 9,600 km migration from the Chukchi and Bering Seas through the Plan Area, to their winter calving waters in Baja California Sur (Bennett, 1989). Non-pregnant females, mature males, and juveniles similarly migrate over succeeding weeks. Grey whales make their return migration northward in two distinct pulses, with the first traveling between February to June and the second from March to July. The earliest migrants are typically pregnant females, adult males, and juveniles. Later migrants including new mothers and calves that migrate more slowly, and arrive within the Plan Area in late March and early April to feed on usual prey items in addition to the seasonal herring spawn coinciding with their arrival. Female gray whales traveling with calves are known to develop site fidelities that they pass on to juveniles (Ellis, pers. comm.). Resident Gray whales have been observed year-round throughout the Plan Area.

Humpback whales (Megaptera novaeangliae) are another blue listed species that utilize the Quatsino Coastal Plan Area. Humpback whales are members of the Family Balaenopteridae and grow to an estimated maximum length of 19 meters and weigh up to 45,000 kg (Caldwell and Caldwell, 1980). Sexually mature females (9+ yrs) can potentially gives birth to one calf every two years, between January and April after a one-year gestation period. Humpback whales typically migrate to the North Pacific in spring, feeding for the remainder of the summer before their fall migration to warmer waters of Hawaii or Mexico where they calve and overwinter. Humpback whales travel and feed in Canadian Pacific waters including the Plan Area from spring to fall. The North Pacific population is classified as a threatened species, estimated at 2,000 whales and representing 33% of the world population (Whitehead 1985). Humpback whales have been observed within Plan Area Subunits 10, 11 and 12 as recently as 2003 during a Fisheries and Oceans Canada cetacean survey (G. Ellis, pers. comm.). Their primary prey items include krill and small schooling fish. Humpback whales are known to concentrate food by forming a bubble curtain, created by expelling air while ascending in a helical pattern beneath their prey.

The Plan Area is also inhabited by the Minke whale (Balaenoptera acutorostrata), which is the smallest of the Family Balaenopteridae measuring up to 11 meters. This typically solitary species is believed to shift northward during the summer months from the Bering and Chukchi Seas and southward to the equator during the winter (Caldwell and Caldwell, 1980). Minke whales have been observed year-round throughout the Plan Area including estuaries, inlets, and fringing reef habitat (D. Schmidt, pers. comm.). Minke whales feed on krill, other invertebrates and schooling fish.

Delphinids

Orcas (Orcinus orca) are the largest member of the Family Delphinidae and a top predator of the coastal British Columbia waters. They have been observed at all times of year throughout the Quatsino Sound Coastal Plan Area (D. Schmidt pers. comm.). Orcas can be separated into three genetically distinct forms known as "residents", "transients" and "off shores" (G. Ellis pers. comm.; Ford et. al., 1994). Amongst other defining characteristics, resident Orcas feed primarily on schooling fish including salmon, whereas transients exploit marine mammals including Pinnipeds, sea otters and other whale species. The less understood off shore Orcas were first catalogued by scientists in 1990 on the continental shelf and have since been observed utilizing nearshore habitat including the Quatsino Plan Area. The population of off

shore Orcas is most recently estimated at 230 individuals, however insufficient data exists to determine trends at this time. Current population estimates of the BC resident Orca population including northern and southern residents are 286 individuals, representing a decrease of 6% since 1994. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists the northern resident Killer whale as a "threatened" species while the southern resident population is listed as and "endangered" species. Approximately 72% of the resident whale population (205 individuals) that occupy a northern range between Alaska and mid-Vancouver Island, have been observed in the Quatsino Sound Coastal Plan Area (G. Ellis, pers. comm.). Resident Orcas exhibit a strong seasonal trend in distribution through the Plan Area that corresponds to the migration of salmon in summer and fall (Ford and Ellis, 1999).

At the current time, there are 220-catalogued transient Orcas. These transients are listed as a "threatened" species and range between southeast Alaska and British Columbia. Whale researcher Graeme Ellis of the Pacific Biological Station reports a growing trend in the transient population, however there is insufficient data to determine if this pattern is attributed to calving rates or adult recruitment from other outside populations. Marine mammal prey species that are favored by transient Killer whales are year-round inhabitants of the Plan Area; therefore food related seasonality is likely not a factor in the distribution of transient Orca populations. Prey species of the transient Orca include seals, sea lions, sea otters and other whales.

Other members of the Family Delphinidae are occasionally observed within the Plan Area and include Harbour Porpoises (Phocoena phocoena), Dall's porpoise (Phocoenoides dalli), and the Pacific white-sided dolphin (Lagenorhynchus obliquidens). Harbour Porpoises are found in the shallower near shore waters where they frequent bays, harbors and estuaries. Dall porpoises prefer deeper ocean waters where they feed primarily on squid, fish and crustaceans. The Pacific white-sided dolphin prefers fringing reef habitat where it feeds on small schooling fish.

Pinnipeds

The Plan Area provides habitat for members of the Suborder Pinnipedia including Harbour seals (Phoca vitulina) and Stellar sea lions (Eumetopias jubatus). Sea lion haul out sites are located in exposed nearshore regions of the Plan Area including Gillam Islands, Rowley Reefs and the islands within Brooks Bay. With over a decade of monitoring Stellar sea lion abundance results suggests that the population has increased within the Plan Area (J. Watson, pers. comm.). Harbour seals are known to utilize the Plan Area year round including winter sites located in Forward Inlet, and the head of Quatsino Sound. Remote areas exposed to ocean swells are favored for summer haul out locations while sheltered inlets and bays may be used in the winter. Harbour Seals are commonly observed near coastal islands, fringing reef habitat, sandbars, inlets, estuaries, and river mouths, with abundance coinciding with spawning of herring and salmon.

Sea Otters

The sea otter (Enhidra lutris) is the only exclusively marine species of the Mustelidae Family. The river otter (Lutra canadensis) and mink (Mustela vison) are also resident to the Quatsino Sound area, but depend on terrestrial and freshwater habitat as well as marine areas for their survival. Amongst other unique adaptations to existing in a marine environment, the sea otter's coat forms an insulating and waterproof barrier. The same dense fur that allows the sea otter to survive precipitated its' historic demise in British Columbia. Motivated by a global demand for the luxurious fur, sea otter harvesting began in the early 1800's and continued for over a century. Extirpated from coastal British Columbia by the turn of the century, sea otters began re-establishing to Quatsino Sound in the wake of a recovery strategy implemented in Checleset Bay between 1969 and 1972. Reports of up to 200 individuals observed in the waters surrounding Winter Harbour are consistent with the effect of the occasional mass

pulse comprised of young male sea otters expanding their range (J. Watson, pers. comm.). The most recent scientific enumeration studies estimate the number of sea otters in British Columbia waters between 2,500 to 3,000. An estimated 17% (500 individuals) of the current BC sea otter population are residents of the Quatsino Sound area and the area appears to be approaching carrying capacity (J. Watson, pers. comm.). Once listed as an endangered species by the Canadian Wildlife Service, its status was recently changed to 'threatened' in recognition of the success of reintroduction efforts. The re-establishment of sea otters to the Plan Area has resulted in significant changes in rocky near-shore benthic communities. The otters feed on sea urchins and other herbivorous invertebrates that typically graze on kelp beds and other seaweeds. Re-establishment of the sea otter population in the Plan Area has led to a reduction of grazing invertebrate prey species including sea urchin and the subsequent recovery of fleshy algae including kelp forests (Watson 1993, Breen et. al. 1982). Kelp forests have been shown to affect biological and physical processes in near shore ecosystems (Foster and Schiel, 1985, Duggins 1980). Duggins et. al. (1989) demonstrated that near shore community structure was 2-3 times more productive in areas with sea otters (kelp rich) than without sea otters (kelp limited) tracing the increased productivity to kelp-derived carbon. Studies have shown that established kelp beds support fish populations by increasing water column complexity and providing suitable habitat for adult and larval fish (Leaman 1976, Simenstad et. al., 1977, Bodkin, 1986, 1988, Laur et. al., 1988, Ebeling and Laur, 1988, Carr 1989, 1991). Mid-water fish species including perch and rockfish are an estimated 45 times more abundant in Vancouver Island west coast areas populated by sea otters compared to areas without (J. Watson, pers. comm.). Kelp beds have also been shown to influence coastal geomorphic processes, which may affect recruitment and dispersal success of organisms associated with kelp beds (Eckman, 1983, Foster and Schiel, 1985, Duggins et. al., 1990). The benefits to near shore habitat in the Quatsino Plan area will continue to be felt with the established sea otter population and restored ecological equilibrium.

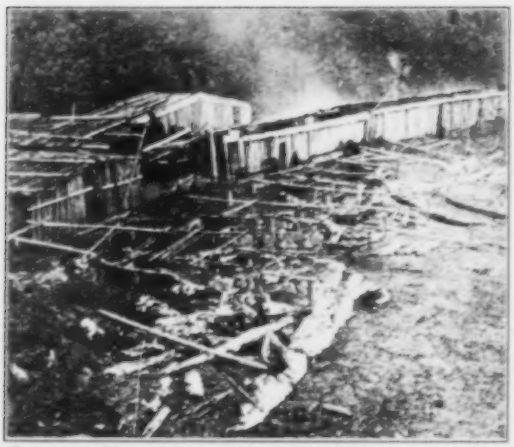
Sea otters are non-migratory animals. Segregation within populations does occur and is typically based upon gender and sexual maturity, with a tendency for males and females to distribute themselves in different locations. Male sea otters will range over a larger area than females, and particularly females rearing pups.

Marine Reptiles

The leatherback turtle (Dermochelys coriacea) is the largest living turtle and the only marine reptile that occurs in the Plan Area. This unique species represents an important component of marine biodiversity. Specimens are occasionally captured incidentally by commercial fishing vessels and have been recorded up to 2.4 m in length and 900 kg in weight. Leatherback turtles have a unique adaptation as facultative homeotherms that can maintain a core body temperature as much as 18°C above ambient, enabling it to range in temperate waters in search of food (Davenport 1988; Cook 1981). Adult Leatherback turtles are the most migratory of all sea turtles and the largest and widest ranging reptile species, capable of annual migrations of more than 15,000 km. They are migratory sea turtles that breed in tropical or subtropical waters and move to temperate waters during summer and fall months in search of food. In the Quatsino Sound Coastal Plan Area, Pacific Leatherback turtles are sighted between July and September when they are thought to feed on seasonally abundant jellyfish species including Cyanea and Aurelia (L. Fairley, pers. comm.). Management of this species includes building awareness to risks associated with motor vessel collisions, entrapment in commercial fishing nets, and the turtle's proclivity for ingesting debris resembling prey items. The Pacific population was facing imminent extinction, but is now considered critically endangered by COSEWIC. Fisheries and Oceans Canada have announced plans in 2003 to implement a recovery strategy and action plan to ensure the long-term viability of the Leatherback turtle populations that frequent Pacific Canadian waters.

2.7 The Quatsino First Nation – History and Continuity

Introduction



Quatsino First Nation village site 1866
Source: BC Archives

The Quatsino people traditionally occupied the outer coast and inner waters in and around Quatsino Sound on northwestern Vancouver Island (Bouchard 1995; Galois 1994). The present Quatsino First Nation is composed of members of five amalgamated tribal groups who are members of the Wakashan linguistic family that speak the Gut'sala dialect of Kwak'wala or Southern Kwakiutl language. Although today the Quatsino live in the Quattishe Subdivision IR #18 near Coal Harbour, they originally inhabited numerous large coastal winter villages and smaller seasonal camps throughout their traditional territory. The Quatsino form a significant part of a rich and diverse aboriginal maritime cultural adaptation of the Pacific Northwest Coast of North America.

The earliest roots of the Quatsino tribal groups and their occupation of north-western Vancouver Island are recorded in the creation stories and ancestral histories that have been passed down through their oral traditions. Each tribal group and family unit had distinct, although very likely related, traditions of their origins and histories (Boas 1935, 1943; Wallas and Whitaker 1994). The earliest recorded archaeological evidence for human occupation in the Quatsino Sound region dates to the Early Prehistoric period between ca. 4000-1000 BC. From the Early into the Late Prehistoric periods (ca. AD 400-1750) the outer coast, the sound and inlets provided a focus for human settlement and natural resource exploitation (Carlson 1990; Mitchell 1990). By the time of early European contact in the late 18th century, the land in and around Quatsino Sound were occupied by four to five distinct Kwakwaka'wakw (Southern Kwakiutl) tribal groups, known as the Saka'sgamakw Gugasāakw, or the "five tribes of the Gut'sala speaking peoples".

Quatsino people 1895 Source: BC Archives

Quatsino Tribal Groups

As with other aboriginal groups of the Northwest Coast, the Quatsino were traditionally a hunting and gathering society, who not only exploited the rich marine resources, but also the abundant terrestrial , bird, plants and tree resources within their traditional territory. The settlement pattern of the Quatsino tribes reflected the seasonal round of tribal aggregation in larger winter village sites and dispersal to smaller family fishing and other resource procurement sites. During the winter months, the tribal groups would aggregate in large winter village sites. This was the season of large inter-group feasting, such as

potlatches and winter ceremonials. In the spring through fall months, they divided into smaller family or kin-groups that were dispersed throughout the landscape to procure seasonally available resources.

The Quatsino consist of five tribal groups – the Huyalas (Hoyalas), the Gwat'sinuxw (Quatsinox), the K'task'inuxw (Klaskinox), the Gop'inuxw (Giopinox), and the Gusgimukw (Koskimox). Each tribal group had a distinct traditional territory, and was composed of several named and hierarchically ranked kin- or clan-groups. In turn, there are indications that these tribal groups were also hierarchically ranked, a system that was expressed through the inter-tribal potlatches.

The Huyalas (Hoyalas)

This now extinct tribal group originally occupied much of the inner waters of Quatsino Sound, including Holberg, Rupert and Neroutsos Inlets, the Goodspeed River system, as well as Alice, Victoria and Kathleen Lakes (Bouchard 1995; Galois 1994). According to some oral traditions, the Huyalas people originated in the area around Quatsino Narrows. According to the Kwakwaka'wakw elder Mungo Martin, the word "hoyalas" translates as "people of Hodzas", a place located at the head of Rupert Inlet.

The Gusgimukw (Koskimox)

This group's name translates as the "people of Kosaa", which is a village site situated at the mouth of the Strandby River on Shuttleworth Bight (Bouchard 1995; Galois 1994). Oral tradition places the origin of the Gusgimukw in the Cape Scott area. At some point the Gusgimukw migrated into the inner waters of the Quatsino Sound area, formerly occupied by the Huyalas. By the late 19th century, observers noted that the Gusgimukw inhabited the greater part of the sound. Their principal winter village was at Quattishe, located at the head of the Sound near Hecate Cove and Quatsino Narrows.

The Gop'inuxw (Giopinox)

The Gop'inuxw people traditional territory originally included Koprino Harbour, Winter Harbour, Browning Inlet, Forward Inlet, Ahwechaolto Inlet, and perhaps as far west as Sea Otter Cove (Bouchard 1995; Galois 1994). By the early 19th century they were constricted to the area around Koprino Harbour, and in the late 19th century, with their population considerably reduced, the surviving Gop'inuxw began to winter at the village of Quattishe.

The Gwat'sinuxw (Quatsinox)

The origins of this tribal group are vague and unclear. Some claim that to they originally came from the Cape Scott area, while others believe it to be Sea Otter Cove and San Josef Bay (Bouchard 1995; Galois 1994). In the early 19th century the Gwat'sinuxw controlled a territory that included Sea Otter Cove, San Josef Bay, Raft Cove, Grant Bay, Forward Inlet, Browning Inlet, Winter Harbour, and Ahwechaolto Inlet. Their principal village sites were Kwatleo in Browning Harbour and Sipee (Grass Point) in Winter Harbour. At some point in the early 20th century, the surviving Gwat'sinuxw members established their permanent residence at Quattishe.

The K'task'inuxw (Klaskinox)

The last tribal group, the K'task'inuxw, had a territory that encompassed an area from the southern shore of Quatsino Sound to Cape Cook (Brooks Peninsula), and east to the Klootchlimmis Creek drainage (Bouchard 1995; Galois 1994). It included Side Bay, Klaskino Inlet, Klaskish Inlet, Le Mare Lake, East Creek, Mahatta River, and Kewquodie Creek. Ethnohistoric evidence indicates that the K'task'inuxw had close connections with the Nuu-chah-nulth tribes to the south. The major 19th century Klaskino village was at Tsoomaks in Klaskino Inlet. At the turn of the century the surviving K'task'inuxw moved to Quattishe.

Recent History

During the early contact period the Quatsino tribal groups participated, both indirectly and directly, in the European maritime trade stage. With the establishment of Hudson Bay Company (HBC) post at Fort Rupert in 1849, the Quatsino had greater access to the western market and goods. During the 19th century, the traditional society of the Quatsino was irreconcilably impacted by various assimilation strategies of the Anglo-European colonizers, including Christianisation, western education (i.e., residential schools), and the gradual integration of the Quatsino into the local commercial resource industries, such as sealing, whaling, fishing, forestry, and mining (i.e., Duff 1997). The official government policies concerning First Nations, led to the creation of reserves and the alienation of the people from their traditional land-base. The introduction of European diseases into the aboriginal populations severely impacted the indigenous Quatsino societies. The high mortality rates resulted not only in a drastic decline in population and the loss of traditional knowledge and ways of life, but also led to the amalgamation and concentration of the survivors at the village site of Quattishe (#IR 1) near Quatsino Narrows. In the 1940s the Federal Government imposed the socio-political amalgamation of the Quatsino tribal groups under the present Quatsino Band. However, despite these impacts, the Quatsino have remained connected to the land and waters of their traditional territory.

2.8 Community and Demographic Profile

The Quatsino Sound Plan Area is in the Mt. Waddington Regional District (RDWM), electoral areas B and C. It is also in the traditional territory of the Quatsino First Nation. Port Alice is the only incorporated community in the Plan Area. Settlements in the Plan Area are Winter Harbour, Holberg, Coal Harbour, Quatsino, Mahatta River, Rupert Inlet and two Indian Reserves (Quattishe (0 population) and Quatsino Subdivision 18 (Figure 13).

The Village of Port Alice began in 1917 with the building of the pulp mill. The village moved to its current location on Neroutsos Inlet in 1965. It is a planned community with a developed infrastructure including good road access via Highway 30 and a major deep sea port facility. The pulp mill is located about 11 km. south of the village site. During the 1970's and 80's Port Alice's population remained around 1,500 persons, but since then has declined steadily to about 1,100 in 2001.

Figure 16. Location of Communities within Quatsino Sound

The settlements of Holberg, Winter Harbour and Mahatta River are located in electoral area "B" of the RDMW (Figure 14). Holberg is a logging camp with approximately 130 permanent residents. It is a field office for most forestry operations on the north side of Quatsino Sound. A number of crews commute from Port Hardy or Port McNeill via a good unpaved road. A Canadian Armed Forces base northwest of tidewater was a self-contained community until it was decommissioned in the 1980s. During the summer, Holberg is the base for visiting Cape Scott Provincial Park.

Winter Harbour is named for its sheltered harbour near the entrance to Quatsino Sound that was frequented by sailing vessels in the 1800's. It continues today as a supply point for the west coast commercial fishing industry and as a sport fishing center. It is located about 40 minutes drive south of Holberg via a difficult unpaved road, and offers limited services. The permanent population is about 20 persons.

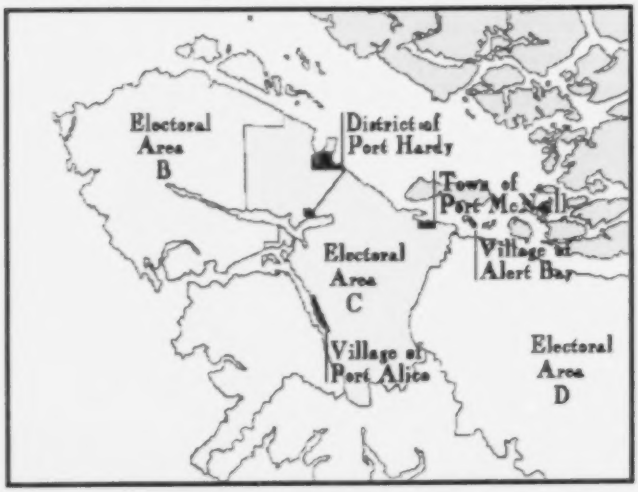


Figure 17. Electoral Area Boundaries, RD of Mount Waddington

The settlements of Quatsino and Coal Harbour are in the electoral area "C" of the RDMW. Quatsino is one of the North Island's earliest settlements. When most travel in the area was by boat, Quatsino was the transportation hub of Quatsino Sound. The community is accessed by a 15-minute water taxi from Coal Harbour and by floatplane. Schooling from kindergarten to 6 is available and older students travel to Port Hardy.

An exact population count and other demographic characteristics for the Plan Area are not available because the Census reporting units are larger than the Plan Area. Data is available for Port Alice and Quatsino Subdivision 18 because these settlements report individually. But rural subdivisions "B" and "C" extend well beyond Plan Area boundaries. In particular, rural subdivision C includes the rural population near Port Hardy and Port McNeil. Nevertheless, the Census data does provide a reasonable indication of Plan Area circumstances.

The population of all four Census units declined between the 1996 and 2001 Census years, from 2,670 to 2,322 or 13%. The Plan Area population (i.e. excluding an estimate of population in MW"C" outside the Plan Area) in 2001 is probably about 1,800 persons. The Plan Area likely experienced a net population decline, with most of the loss in Port Alice (which reported a net loss of 233 persons between 1996 and '01 Census years). The downturn in resource industries (i.e. forestry, commercial fishing) during the period probably contributed to an out-migration of inhabitants in search of better economic conditions. It is noted this condition affected the North Island generally, with the RDMW population declining from 14,601 persons in 1996 to 13,111 in 2001, a decline of 10.2%.

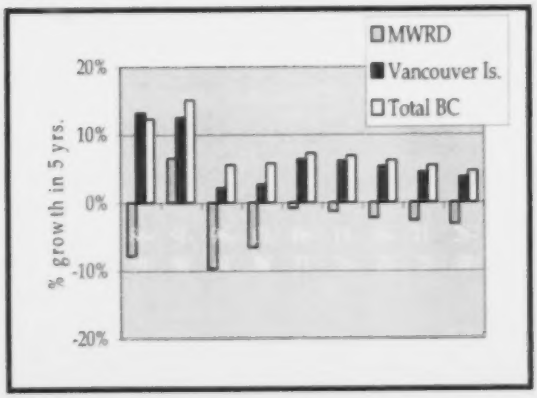


Figure 18. Current and Historic Growth Rates
Source: BC Stats

This general contraction is also reflected in the real estate market which has been characterized by relatively few transactions, relatively low house prices and high vacancy rates. Recent buyers in Quatsino and Coal Harbour are seeking either retirement or second home/recreation property.

The Plan Area's median age* of 39.4 years is slightly older than that of the province (38.4 years) and significantly older than the RDMW of 35.5 (Figure 16). This can be attributed to the higher proportion of Plan Area population in the 45-65 year age bracket. The relative lack of health care and other services for seniors likely accounts for the low proportion of 65+ aged persons resident in the Plan Area and the RD. Within the Plan Area, the Census information indicates considerable variation among settlements. For instance, the median age in Port Alice and MW"B" is about 40 years compared to 22 years in Quatsino Subdivision 18▲. The number of males slightly outnumbers the number of females. About 17% of the population is First Nations identity, compared to the provincial average of about 4%.

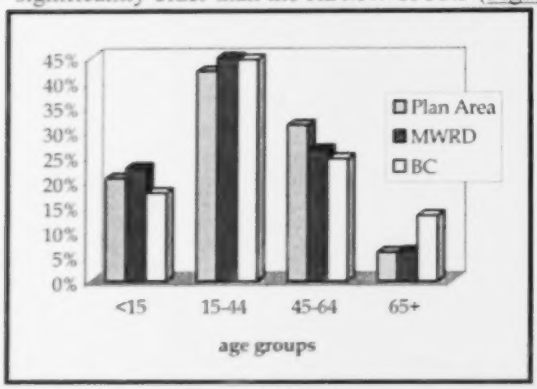


Figure 19. Population: Median Age
Source: BC Stats

A long-term population forecast prepared by BC Stats indicates a continuing decline in the RDMW population (Figure 16). This forecast is reflective of the regional district's age structure (hence rate of natural increase) and historic migration patterns. Given the Plan Area's older population, a proportionately larger share of the RDMW's decline in population may occur in Plan Area communities. Nevertheless, it is emphasised that positive external events during the period (for example a major new investment) could greatly influence or even reverse the indicated trend.

The Plan Area's population mobility is similar to the provincial average. That is, 82% of the population lived at the current address for at least the last year. This compares to 84% provincially. For the RDMW, the proportion was 78%, indicating somewhat greater mobility.

Quatsino First Nation

Figure 20. Current and Historic Growth Rates Source: BC Stats

The band population is about 350 persons. About 200 reside on the Band's reserve (Quatsino Subdivision 18) located between Coal Harbour and Port Hardy. The band recently returned to the treaty process and is discussing a framework agreement (beginning Stage 4).

A key economic objective of the Quatsino First Nation is to increase employment among band members. Currently, forestry is the largest single employer. The band harvests about 30,000 cubic meters/yr. under contract to Western Forest Products. It has recently been awarded a non-replaceable timber sale license of 198,000 cubic meters to be harvested over a five to seven year period. Harvest has not yet commenced on this license. The band also holds a woodlot license.

The band has three shellfish tenures on Holberg Inlet. The tenures have been harvested and the band expects to expand on this experience. The band is also seeking to expand employment in commercial fishing activities. The band holds a crab license and recently obtained a dog fish license, and owns a suitable boat for these activities. The band also owns a seiner, which it subleases. The band is endeavouring to secure employment on the leased vessel for band members to gain valuable experience.

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* Age at which 50% of the population is older and 50% younger.

▲ The relative preponderance of middle aged persons in Port Alice may have resulted from the out-migration of the relatively younger tradesmen employed by the pulp mill, which has operated intermittently in recent years

The band recognizes the tourism potential of the Sound and it is presently in the planning stages to determine how they might participate in this expanding industry. The band is constructing a gas station on reserve land, which will also be a source of band employment.

2.9 Income and Labour Force Information

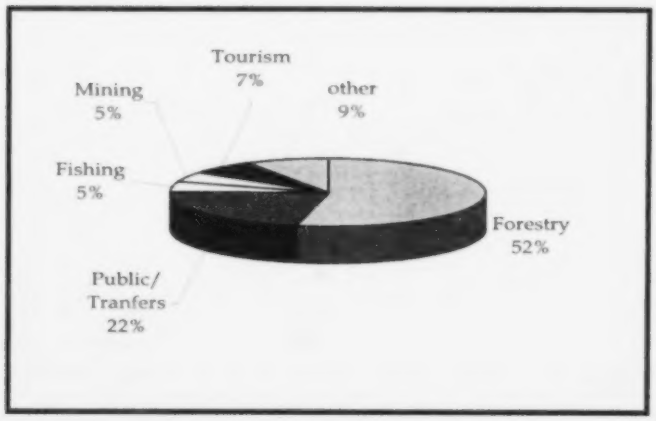


Figure 21. Income by Industry for North Island (1996)
Source: Stats Canada

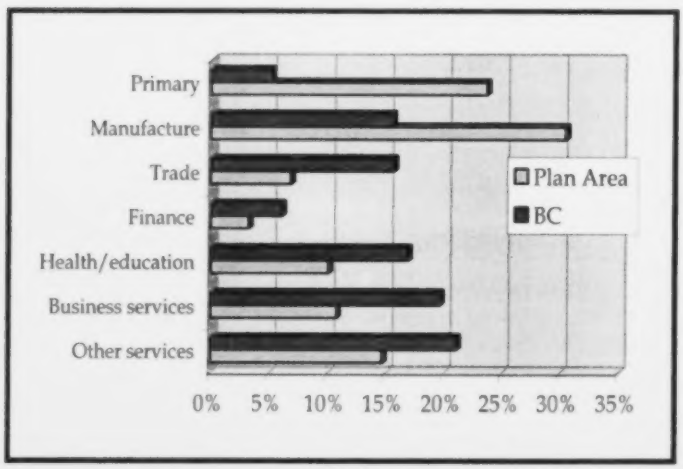


Figure 22. Labour Force Distribution By Sector
Source: BC Stats

Earnings and Labour

Average Plan Area income (wages and salaries averaged over the number of people with earnings) in 2001 was in the order of $38,400♦. This is significantly above the RDMW and provincial average earnings of $31,600. Average earnings in Port Alice areis in the order of $40,000 and contributed to the Plan Area's relatively high average earnings.

The Plan Area's unemployment rate in 2001 was 10.3%. This is above the provincial average rate of 8.5%, but slightly less than the RDMW unemployment rate of 10.7%. Port Alice had the lowest rate of unemployment at 5%, while the Quatsino Subdivision 18 was 35% and MW"B" was 24%.

Labour Force by Sector

There are about 1,400 persons active in the Plan Area labour market. The distribution of the labour force is one indicator of the structure of economy (Figure 18). Relative to provincial distribution of labour, the Plan Area labour force is concentrated in primary industries (e.g. forestry, fishing, mining, agriculture) and manufacturing (i.e. resource processing such as pulp manufacturing). Its service sector appears to be less well developed. Residents may travel to Port Hardy, Port McNeil or beyond to obtain goods and services not available in the Plan Area. Government analysis• of the Port Hardy

• Average income may be overstated because the calculation excludes MW"B" and Quatsino Sub-division 18 because the data is suppressed due to small population

Figure 23 Labour Force Distribution

• ***British Columbia Local Area Economic Dependencies and Impact Ratios – 1996.*** BC Stats. Ministry of Finance and Corporate Relations.

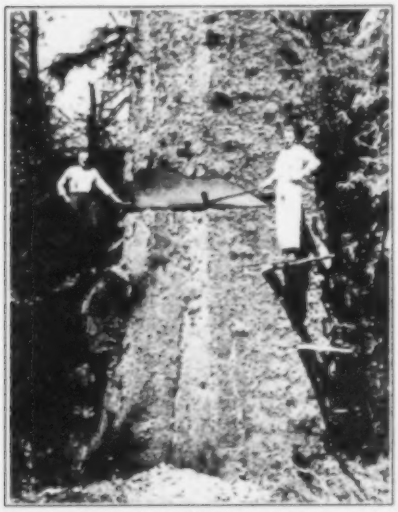
region (includes Plan Area as well as Port Hardy and Port McNeill) found a very high level of dependency on the forest industry. The analysis used 1996 Census data and found that 51% of the region's income depended on forest industry activity. Similar analysis completed for Port Alice found that 85% of the community's income was connected to the forest industry. Public sector and transfer payments account for the balance of Port Alice's income.

The important income generating economic activities were identified in the preceding section. A more detailed picture of the industries contributing to the Plan Area's income and employment follows.

Overview of Important Plan Area Industries

Forestry

Most of the land surrounding the Sound is forested. Western Hemlock is the leading commercial species. Other species harvested are balsam, western redcedar, Sitka spruce, Douglas-fir and alder. Within the shelter of the Sound, tree-growing conditions are good, while the wind-swept outer coast has generally poorer growing sites.



Logging in Holberg Valley, 1947
Source: BC Archives

Most of the economically valuable forested land bordering the Plan Area is in TFL 6 (Block 1) held by Western Forest Products Ltd. The remaining Crown forestland is part of the Kingcome Timber Supply Area (TSA). Those holding licenses on these lands include International Forest Products ltd., Weyerhaeuser Company Ltd., Canadian Forest Products Ltd., Le Mare Logging, Quatsino First Nation, and BC Sales.

TFL 6, known as the Quatsino TFL, is 198,113 hectares. The present allowable annual harvest volume is 1.46 million cubic meters. The long term timber supply analysis indicated a modest decline over the next few decades before increasing (Ministry of Forests, 2001).

Approximately 1.1 million cubic meters of the TFL's AAC is near to Quatsino Sound. On average, about 800,000 cubic meter per year harvested to the west of Rupert and Neroutsos Inlets is towed by water to haul-out sites at the eastern end of the Sound (i.e., at Juene Landing and Rupert Inlet). Most of this volume is loaded on to barges and towed west out of the Sound to affiliated mills on Vancouver Island and the lower mainland. In 1999, logs from the TFL accounted for 100 percent of the log intake of the Duke Point sawmill, 67 percent of Ladysmith, 49 percent of Silvertree mill, 15 percent of Tahsis mill, 13 percent of Cowichan Bay, and one percent of Nanaimo

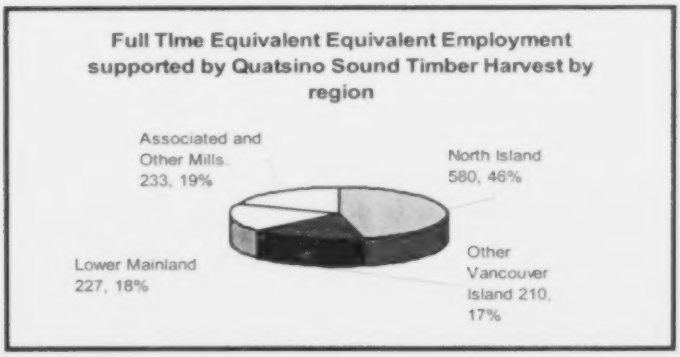
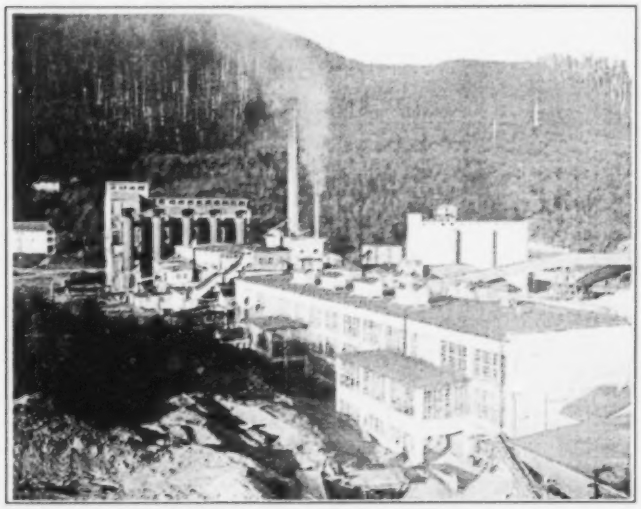

Full Time Equivalent Equivalent Employment supported by Quatsino Sound Timber Harvest by region
Associated and Other Mills, 233, 19%
North Island 580, 46%
Lower Mainland 227, 18%
Other Vancouver Island 210, 17%

Figure 24. Forestry Employment from Quatsino Sound Timber Harvest
Source: Stats Canada

sawmill's fibre requirements (Figure 20).

Most of the TSA logging operations (from Brooks Supply block) deliver logs to tidewater at various locations including Mahatta River and Cleagh Creek. The annual volume varies, but is generally about 150-200,000 cubic meters per annum. From these locations, the logs may be barged west, or towed east to Port Alice pulp mill or loaded onto trucks for transport to the east side of the Island.



Port Alice pulp mill, 1947 Source: BC Archives

The sulphite pulp mill near Port Alice (owned by Western Pulp Partnership Ltd.) is a large consumer of low quality logs. The mill's pulp is used for making fine paper and a wide range of specialty products. When at full production♣, the mill produces 160 million tonnes of kraft pulp. The corresponding log input is some 960,000 cubic meters. This entire log volume is delivered to the mill by water. On average, about 95% of the mill's pulp production is shipped by water to offshore customers. The mill directly employs some 410 persons (50 percent of current employment in the Port Alice) with an annual payroll of $35 million.

The forest industry has a significant economic influence on all the Plan Area settlements, particularly Port Alice, Holberg, and Coal Harbour. Several other sites around the Sound have in the past been important forestry operational centres, sometimes with temporary or more permanent resident populations. These include Winter Harbour, Koprino, Mahatta River, and Rupert Inlet.

Based on recent timber flow analysis, logs harvested around Quatsino Sound (TSA and a share of TFL 6), about 580 FTEs of direct employment are supported on North Vancouver Island, 210 elsewhere on the island, 227 in the Lower Mainland, and an additional 233 elsewhere.

The industry is the dominant economic contributor to the Plan Area economy. It relative dominance will continue, although significant growth is not expected. Looking to the future, significant changes in the logging volume or mode of transport are not expected (i.e. split between road and marine transport). Recent changes in government forest policy may bring in other operators, as the available volume is re-allocated. The Province's coast forest industry is facing a number of challenges and these are clearly effecting operations in Quatsino Sound. Nevertheless, the relatively low cost marine storage and transportation of logs, goods and products is an important competitive advantage to Quatsino Sound operators.

Tourism and Pubic Recreation

The Quatsino Sound tourism industry is at a relatively early stage of development. Historically, most of the accommodation and food-and-beverage business were associated with servicing the forestry and commercial fishing business. More recently, the industry has begun to expand from this base by providing services to visitors seeking various recreation/leisure time activities.

♣ Recently the mill has been operating intermittently. This discussion quotes mill operations assuming full production.

The Plan Area contains fishing resort/lodges, a number of bed-and-breakfast accommodations, camping facilities (in Quatsino, Coal Harbour, Port Alice and Winter Harbour), and independent fishing guides. While the dominant "product" is salt water fishing, the area has the potential for a broad range of tourism activities, particularly in marine eco-tourism, First Nations heritage and historic sites. Tourism opportunity studies conducted in recent years identified several sites where the natural and/or cultural resources exist to support tourism activity.

As is typical of this early stage, poor infrastructure, limited number of operators and lack of "product" recognition constrain the sector's growth. Anecdotal information indicates recent investments are increasing the number of accommodation units, operators and range of products. The industry is also limited by the short season, with most of the industry earning its annual income in July and August (i.e. about nine weeks in total). However, as the industry grows it typically begins to offer products in the shoulder seasons, increasing the number of visitors and range of products/services. An objective measure of the industry's recent growth is not available. It appears to be positive, and the expectation is that industry outputs could double from its current level within the next 3 to 5 years.

Nearby Cape Scott Provincial Park draws visitors to the area. Park visitor information for 1999 and 2000 indicate that 4 to 5 thousand persons visit the park over the summer months, with the August being the peak time. Marble River and Quatsino parks are located at the eastern end of the Plan Area. No use data is available on these areas. Forest recreation sites and three trails in TFL 6 are other recreation features. The economic impact of visitors to the parks near the Plan Area is not known.

The outlook for the sector is positive. The industry's primary draw is salmon fishing opportunities supported by the Sound, and related eco-tourism activities.

Minerals and Mining

Table 9. Mineral Production and Potential in Quatsino Sound Area

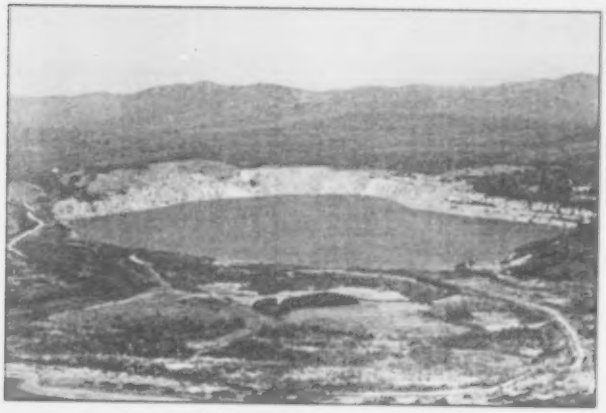
Past Producers		
Name	**Primary minerals**	**Production period**
Merry Widow	Iron	1957-67
Yreka Mt.	Copper, Silver, Gold	1902-04,1917,66-67
Island Copper	Copper, Molybdenum, Silver, Gold	1971-95
Juene Landing	Limestone	1919-60
Kosheemo Coal	Bituminous coal	Not available
Developed Prospects	**Reserve status**	
Red Dog	Copper, Gold, Molybdenum,	25 Mt Combined (1992)
Hushami	Copper,Gold, Molybdenum	Proven and probable reserves (1994)
Fox	Limestone	236 Mt Unclassified (1975)
H&W	Silica	Inferred (1979)

Source: Minfile database. Ministry of Energy & Mines

The Plan Area demonstrates promising mineral potential. The land north of Holberg and Rupert Inlets, called the Port Hardy copper porphyry area, includes several bodies of metal-bearing minerals, mainly copper with some precious metals and molybdenum. Also found are minor coal seams, marble, limestone and other construction minerals. Mineral tenures cover most of the area north of Holberg Inlet, and smaller clusters of mineral tenures occur at Varney Bay, Thurbury Bay and Harvey Cove.

There are no operating mines at present, but there are a number of past producers and a number of developed prospects that may evolve into operating properties. Also, there are numerous mineral showings identified by explorationists.

To date, the Plan Area's most significant mineral development is the Island Copper mine. Between 1971 and 1995 it produced 1.2 billion kg of copper, 31.4 million kg of molybdenum and over 330,000 kg of gold. The mine's concentrate was shipped monthly by 30,000 tonne vessels.
Mineral reserves at two similar deposits in the Port Hardy copper porphyry area have reserves of about 200 million tonnes of ore, and commercial mining has occurred on Nimpkish and Bonanza Lakes. Exploration has identified some indications of precious metals to the south of the Holberg-Rupert axis.



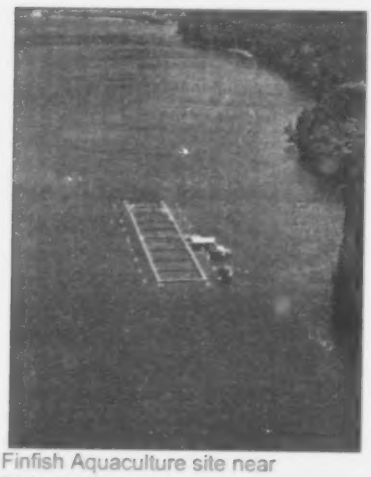
Deactivated Island Copper mine site, 2003
Source: Graham Winterbottom

Limestone formations on the east of Quatsino have potential for construction stone and cement. Construction limestone is mined at Benson Lake, inland from Neroutsos Inlet. A construction materials firm has recently explored a marble and limestone prospect at Marble River.

Intermittent exploration continues in the Plan Area, but no reported active exploration is currently underway. Direct employment related to the mineral development in Plan Area is presently not large.

Quatsino Sound offers a number of advantages from a mineral development perspective. At the exploration stage, water access provides low cost entry to prospective lands. Secondly, some minerals, such as clay and aggregate deposits are located near the shoreline. For the production of high volume relatively low value commodities, such as industrial minerals (aggregates, clay, silica, limestone, etc.) and metal concentrates, the direct transfer to low cost marine transport offers a significant cost advantage relative to mines that must ship some distance by truck or rail.

Aquaculture, Commercial Fishing and Marine Harvests



Finfish Aquaculture site near Mahatta River
Photo: Graham Winterbottom

There are six finfish aquaculture tenures in Quatsino. Five are owned by Stolt Sea Farms Ltd and the other is owned by Omega Salmon Group Ltd. There are an additional three fresh water farms. One is an Atlantic salmon hatchery and the other two are grow-out operations (for Atlantic salmon, white sturgeon, trout and crayfish). As noted earlier, the Quatsino First Nation holds shellfish tenures on Holberg Inlet, and three tenure applications in Buchholz Channel are progressing through the approvals process.

Atlantic salmon is raised in the fish farms. It takes about 20 months to rear the salmon from smolt to market size. Stolt transports "harvested" fish by boat in live storage around Cape Scott to Port McNeill for processing. The Omega farm transports its produce to the dock at the Utah mine site where it is transferred to trucks and taken to Port Hardy for processing.

At the six farm sites, there are a total of about thirty persons working full time. Additional employment is supported in the processing plants in Port McNeill and Port Hardy. The BC Salmon Farmers Association states the industry generates 121 year-round jobs with

$3.4 million annually in salaries and benefits in the Mt. Waddington Regional District. Twenty-five sites in the regional district produce about 6 million kilograms of salmon yearly, with the majority of the employment and benefits in Port Hardy and Port McNeill, where there are 13 associated service companies. In 2002 calendar year, the industry's total production in Quatsino Sound was approximately $9 million. This is expected to double in the next couple of years as the existing farms in the Sound move to full production.

There is little current shellfish production. The Deepwater shellfish tenures near Drake Island and Buchholz Channel will test the productivity for mussels and oysters. Provided the tests results are promising, the tenures are anticipated to begin delivering product within the next three years.

For the finfish aquaculture industry, Quatsino Sound's key advantage is its favourable water temperature. Low cost access to the industry infrastructure at Port Hardy and Port McNeill is also an advantage.

Commercial troll fishing for salmon occurs in the Sound. A variety of other species are also landed in the Sound. DFO has a responsibility for the support of new and emerging fisheries. The development of new fisheries may offer new economic opportunities for local communities. The objective of the strategy for new and emerging fisheries in the Pacific Region is to assist First Nations, fishermen, and communities in reducing their dependence on salmon by developing sustainable and viable new fishing opportunities for underutilized species by increasing the value of these fisheries and by developing new non-salmon aquaculture opportunities.

Other Marine Activities

Table 10. Commercial Salmon and Shellfish Landings in Quatsino Sound

Species	Landed weight (kg's)
Chinook	1,774
Chum	262
Crab	33,289
Geoduck	10,459
Octopus	496
Prawn	26,824
Urchin	17,833

Source: DFO Commercial Salmon and Shellfish Catch Statistics Area 27; salmon species year 2000 data, shellfish year 2001.

There are at least two federally-permitted ocean dumping sites at depths of about 50 m or greater in Neroutsos Inlet. No information on current or past uses of the sites is available.

Other marine transportation includes scheduled and chartered boat service to the outlying communities and to work sites around the sound. Commercial fishing vessels working the West Coast of Vancouver Island area frequently use facilities at Winter Harbour, Quatsino and Coal Harbour for resupply, fuelling and crew changes. A water taxi operates out of Coal Harbour.

Conclusion

The marine waters of Quatsino Sound underpin many of the economic activities important to the Plan Area's communities. Most of the area is remote, thinly settled and sparsely roaded. Water transport makes accessible otherwise inaccessible areas, and for forestry and mine activities the low cost marine transportation is a competitive advantage. The Sound's clean, relatively warm water supports an abundance of marine life. This provides the foundation for an emerging tourism industry and supports the Sound's commercial fisheries and marine aquaculture.

3.0 Plan Framework and Direction

3.1 Use of the Plan

The Quatsino Sound Coastal Plan is designed to assist prospective land tenure applicants, First Nations, local government, LWBC and other government agencies in dealing with applications for the use of provincial Crown foreshore and nearshore tenures. The Plan may also provide a useful tool to assist in the marketing of local community and Quatsino First Nation economic development.

Use of the Plan should benefit the Quatsino First Nation, local government, LWBC and other government agencies by screening or filtering out potential Crown land applications which may have limited suitability for success. In this way, work loads of these agencies and organizations can be expected to be lowered in both volume and level of complication or controversy.

Although the Plan has been developed with the assistance and support of the Regional District of Mount Waddington, the Plan is not intended to replace the need for referrals to local government. Similarly, the Plan is not intended to replace provincial or federal agency referrals or to absolve LWBC from addressing its legal obligations to consult with the Quatsino First Nation on land tenure applications.

With the exception of other compelling constraints or LWBC application requirements, applications for uses that are consistent with the Plan should be accepted and evaluated by LWBC. The Plan's recommendations for tenure applications are not intended to address operational or production requirements associated with finfish, shellfish or marine plant aquaculture. These aspects of aquaculture are addressed in aquaculture management plans associated with aquaculture tenures.

Future development of offshore oil and gas resources was not considered in developing the Plan. This Plan and its recommendations will not affect or prejudice any offshore oil and gas development, including any land requirements associated with offshore oil and gas activities.

3.2 Strategic Direction

Vancouver Island Summary Land Use Plan

The Vancouver Island Summary Land Use Plan (VILUP), approved in 2000, identified Quatsino Sound as a high priority area for coastal planning.

The recommendations of the Quatsino Sound Coastal Plan are intended to be consistent with the general direction provided by the goals, objectives and strategies outlined in the Vancouver Island Land Use Plan. This plan responds to that recommendation and provides detailed planning recommendations consistent with the strategic direction of the VILUP.

The Plan Area abuts six of the Resource Management Zones (RMZs) identified by the VILUP. Those zones are summarized below in Table 11. Appendix IV presents detailed management provisions for each of these zones.

Table 11. Vancouver Island Land Use Plan Resource Management Zones

VILUP RMZ	Location:	Overall Management Guidance
SMZ-2: West Coast Nahwhitti Lowlands	Terrestrial zone extending along coastline south-east of Cape Scott Park; encompassing Raft Cove protected area (approx 15,100 ha)	Special Management Zone for significant scenic and recreational values which are concentrated along narrow coastal strip; additional consideration should be on maintenance of the high riparian fish and coastal wildlife values
SMZ-3:	Terrestrial and coastal nearshore Zone	Special Management Zone with a focus on maintenance

VILUP RMZ	Location:	Overall Management Guidance
Brooks Bay	extending along the south side of Quatsino Channel to Klaskino Inlet (approx 10,200)	and/or restoration of high scenic/tourism/recreational values, as well as coastal, riparian and upland habitat values. Includes coastal nearshore from Cliffe Point to Klaskish Inlet)
SMZ-4: Koprino	Terrestrial zone situated between Jules Bay and Koprino Harbour, connecting to SMZ 2 in the south-east (approx 6,100 ha)	this SMZ should become a focal area (within the landscape unit) for the retention of old forest and associated wildlife habitat, as well as for mature and old forest connectivity
RMZ-4: San Josef-Koprino	Terrestrial zone bounded by Cape Scott Park and SMZ 2 to the west, extending south-east, bounded by Holberg Inlet and Quatsino Sound; includes Ahwhichaolto Peninsula (approx 56,000 ha)	Enhanced Forestry Zone suited for enhanced timber harvesting and production, while maintaining fish values and watershed integrity
RMZ-5: Holberg	Terrestrial zone extending along northeastern shore of Holberg Inlet to Port Hardy (approx 40,500 ha)	Enhanced Forestry Zone suited for enhanced timber harvesting and production, while maintaining fish values and watershed integrity
RMZ 8: Mahatta-Neroutsos	Terrestrial zone bounded by Quatsino Sound and Brooks Bay SMZ to the north and west, extending east surrounding Neuroutsos Inlet; in Windward Mountain ecosection. (approx 64,800 ha)	Enhanced Forestry Zone suited for enhanced timber harvesting and silviculture; wildlife values in Mahatta system (esp. in Mahatta draft landscape unit) and marbled murrelet values in noted drainages require specific integration through maintenance of old seral forest; objectives for other resources are to be integrated at the basic stewardship level in accordance with the Code requirements

3.3 Federal Planning

The Quatsino Coastal Management Area has been identified by DFO as a pilot area for integrated management (IM). For more information on the goals of this project, readers are encouraged to review the Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada available on the web at http://www.cos-soc.gc.ca/doc/publications_e.asp

3.4 Navigable Waters

The federal Minister of Fisheries and Oceans ensures the protection of the public right to navigation and the protection of the environment any body of water capable of being navigated by floating vessels of any description for the purpose of transportation, commerce or recreation through the administration of the *Navigable Waters Protection Act* (NWPA). This Act addresses navigation on both inland and coastal waters. As a consequence, any application for tenure that has the potential to impact navigation is subject to review and assessment.

Navigational routes identified on the planning unit maps are intended to highlight areas of Quatsino Sound that are commonly used for navigation purposes and thus are areas in which tenures would be at high risk for conflict with *NWPA*. The information presented on the map was gathered from members of the local community that regularly and frequently use Quatsino Sound for navigation. Applying for tenure in areas of Quatsino Sound that are not currently identified as having a significant impact on navigation does not necessarily guarantee federal approval. These routes are included for illustrative purpose and do not supercede Coast Guard's responsibilities for enforcing the *NWPA*. Coast Guard retains the right to assess all applications on a site-to-site basis and require mitigation when deemed necessary.

Navigation routes depicted on the maps include routes used for primary and secondary shipping, as well as log towing. These routes are not necessarily drawn to scale; the width and position of route will vary

according to ship type, weather and other navigation concerns. The routes themselves are divided into two categories:

- Assessment Area 1 (■) – This buffer is immediately adjacent and parallel to the shipping route. Applications for tenure in this area are unlikely to receive approval from Coast Guard.
- Assessment Area 2 (□) – This buffer extends on either side of Assessment Area 1 and reflects the realistic variation of routes according to size and type of ship, weather, etc. In areas where log tow operations are known to be affected by prevailing conditions, the buffer has been expanded to reflect those areas at risk of contact with swinging log booms being towed in the shipping route. Applications for tenure that include portions of these areas will be subject to further assessment as required by NWPA but may receive federal approval pending the feasibility of effective mitigation measures being developed.

Areas outside these buffers have a lower potential for conflict with marine navigation, and will be assessed on a site specific basis. Mitigation measures may still be required. For more information on the navigable Waters Protection Program, refer to http://www.ccg-gcc.gc.ca/nwp-pen/NWPoverview_e.htm.

3.5 Parks and Protected Areas

Tenured uses within existing Class A, B and C provincial parks are managed through park use permits issued under the authority of the Park Act. Although the specific evaluation of use applications is undertaken by WLAP (BC Parks) generally, extractive uses, including logging, mining and hydroelectric development are not permitted or subject to greater scrutiny. Park uses are coordinated through the Park Management Planning process. Management plans have been completed or are underway for the following Quatsino area parks:

- Cape Scott (approved management Plan 1991)
- Brooks Peninsula (approved IMS 1992)
- Marble River (active Management Direction Statement process)
- Quatsino (active Management plan process)
- Raft Cove (approved management Plan 1993)

Within protected areas designated under the Environment and Land Use Act, specific resource management measures are specified in the Order in Council (OIC) establishing the area. Specific provisions of the Park Act and Park and Recreation Area Regulation may apply if directed by the OIC. There are currently no ELUC designated protected areas within the Quatsino Sound Plan Area.

Ecological Reserves are distinguished from Provincial Parks by their emphasis on conservation over recreation. Under the Ecological Reserve Act uses are highly restricted in ecological reserves and all extractive uses are prohibited. Within the Quatsino Sound Management Plan Area there is one ecological reserve at Klaskish River. This area was established in 1990 to conserve estuarine and alluvial forest values in the Coastal Western Hemlock biogeoclimatic zone. Solander Island Ecological Reserve, nested in the marine component of Brooks Peninsula Provincial Park, was one of the first ecological reserves established in the Province (1971). Its role is to protect large nesting colonies of a broad range of seabirds from human disturbance. Public access to Solander Island is consequently restricted.

This Plan does not make recommendations on provincially managed uses within provincial parks and ecological reserves. Where, however federal managed uses and activities are identified within the marine

and nearshore components of these areas, recommendations will be made to harmonise these practices with the established roles and purposes of these areas.

3.6 Planning Units and Unit Data

The area covered by this Plan has been divided into 15 smaller planning units to permit a more precise examination on uses and interactions occurring in the Plan Area. The planning unit boundaries are largely based on marine ecosystem classification with some modification to reflect human use patterns and specific biological features. Section 3.7 of this Plan presents descriptions, and management recommendations for each of these units. For each planning unit, a description and map is provided of resource attributes, existing tenured uses, non-tenured activities, status of adjacent upland, and resource capabilities for selected activities. Some, but not all upland features and non-tenured activity areas are shown, since the Plan does not prescribe uses for these upland areas or activities not under provincial jurisdiction (e.g. informal recreation sites used by the public). The legend to the unit planning maps is included as Figure 20.

Planning Unit descriptions and attributes reflect data drawn from two sources. Established government databases are the source of most of the data in this Plan. Such data has been collected and assembled according to standardized methods determined by the Province's Resource Information Standards Committee. This approach helps to ensure the quality and consistency of that data. An equally important source of data is local knowledge gained through stakeholder consultation for this Plan. Local knowledge often provides insight into particular attributes of an area; however, because this data is not gathered and validated according to provincial data inventory standards, it cannot readily be added to established government databases. Planning unit attributes that are based on local knowledge are identified with an asterisk "*". While this data is useful and important to the Plan, users of this Plan are cautioned that that data has not been validated.

Figure 25 Legend for Planning Unit Maps

3.7 Uses and Activities

This Plan addresses a range of uses and activities that occur in foreshore and nearshore areas. It applies specialized definitions of the terms use and activity. Use refers to undertakings that are subject to provisions of the provincial Land Act requiring that they be tenured. Table 12 lists and describes uses that are addressed by this Plan. Activities are undertakings that are not subject to provincial tenure. Table 13 presents a generalized list of activities known or anticipated to occur in the Plan Area. This Plan makes recommendations regarding uses, but not activities. Activities are listed in this Plan to ensure that the range of undertakings (uses and activities) is considered when management decisions are made. Note that Table 12 limits its descriptions to the specific uses defined and does not include ancillary structure or related facilities. This is intended to provide more precise direction regarding acceptable environmental impacts.

3.8 Capability Assessment

Planning unit descriptions and maps in Section 3.9 contain data regarding capability of areas to support aquaculture. These capability assessments provide reconnaissance-level analysis of physical conditions for salmon aquaculture, beach culture of oysters and manila clams, and deepwater culture of scallops and oysters. Kelp culture is recognized as an emerging aquaculture industry. Scallop aquaculture capability is used in this plan as a surrogate for kelp aquaculture capability due to similar biophysical requirements.

Capability assessments performed at this broad scale cannot be used to determine whether a specific site will be a good place to culture shellfish, finfish or kelp. Site specific capability and feasibility studies as well as tenure and licence application and referral are still necessary to gain access to a particular site. The capability studies help potential culturists to determine where they are most likely to find a site that will support culture, thereby helping to focus where to conduct feasibility studies.

Determination of Use Acceptability

The determination of acceptable uses is based on decision rules that consider existing use commitments, compatibility, and agency siting and best management practices. A list of basic decision rules and other decision assistance tools are provided in Appendix V. This initial determination was refined to reflect review and discussion with the public, local advisory committee members, local government, First Nations and stakeholder groups (see Appendix III). The process is identified conceptually in Figure 25.

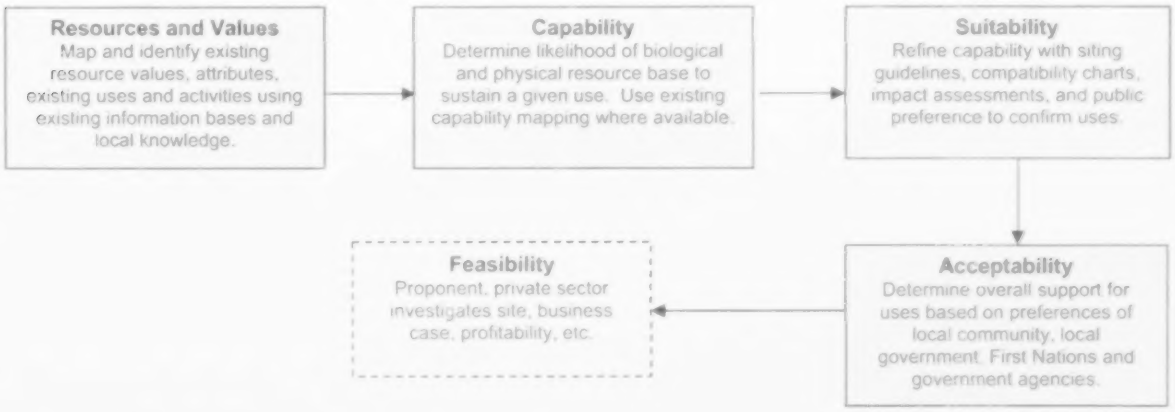

Resources and Values
Map and identify existing resource values, attributes, existing uses and activities using existing information bases and local knowledge.
Capability
Determine likelihood of biological and physical resource base to sustain a given use. Use existing capability mapping where available.
Suitability
Refine capability with siting guidelines, compatibility charts, impact assessments, and public preference to confirm uses.
Acceptability
Determine overall support for uses based on preferences of local community, local government, First Nations and government agencies.
Feasibility
Proponent, private sector investigates site, business case, profitability, etc.

Figure 26. Use Recommendation Process Conceptual Diagram

3.7 Uses and Activities

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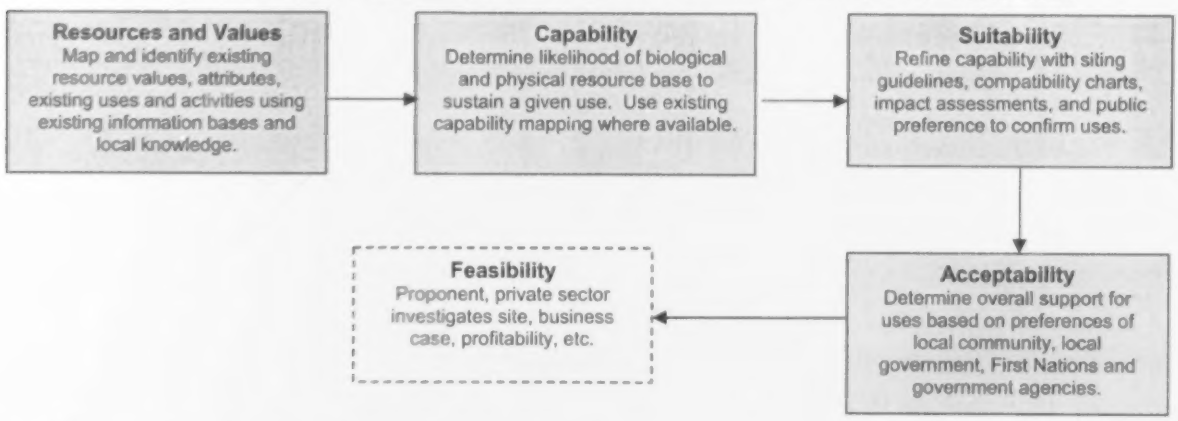
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Refine capability with siting guidelines, compatibility charts, impact assessments, and public preference to confirm uses.
Acceptability
Determine overall support for uses based on preferences of local community, local government, First Nations and government agencies.
Feasibility
Proponent, private sector investigates site, business case, profitability, etc.

Figure 26. Use Recommendation Process Conceptual Diagram

Table 12. Foreshore and Nearshore Uses

Use	Sub Use	Description	General Category Parameters
Shellfish Aquaculture		The commercial seeding, growing and harvesting of marine molluscs, and shellfish, or other invertebrates in a natural or manufactured environment	Includes cultured species and any associated food and medical supplements, waste generated by cultured species.
	Beach Culture	Includes both beach and near bottom culture methods that are conducted within the intertidal zone.	
	Deepwater Culture	Includes any suspended culture methods or culture on the seabed below the low tide mark including suspended trays, lines or other structures anchored to the seabed	
Finfish Aquaculture		Growing of salmon and other species (Fish of the classes Agnatha, Chondrichthyes and Osteichthyes) in deep water net cages or other containment structures, anchored to the seabed or foreshore.	
Marine Plant Aquaculture		The commercial growing and harvesting of marine plants in a natural or manufactured environment, for sale as a commodity or use for feed for other organisms	
Private Residential Moorage		Year round facility comprised of a single floating dock, wharf or pier (including walkway ramp) or combination thereof, used for moorage by a number of individuals or a family unit. Not normally removed in its entirety on a seasonal basis. Private moorage does not: Interrupt movement of beach material by water along shoreline, unless specifically permitted; Impede public access to and use of foreshore Constitute a hazard to navigation	Private moorage is permitted where associated with private land or crown leases on upland Includes physical structure, improvements including permanent private ways, boat house and walkway ramp or other pedestrian linkage to upland. Structure limited to floating and pile based designs. Design intended to occupy the smallest footprint possible. Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
Light Docks, Wharves and Facilities			Includes physical structure, improvements including permanent ways, boat house and walkway ramp or other pedestrian linkage to upland. Structure limited to floating and pile based designs. Design intended to occupy the smallest footprint possible. Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
	Light Industrial/ Commercial	Year round facility similar in design and extent to private moorage. Used by businesses supporting up to 5 workers. Structure intended to provide pedestrian access.	
	Public (Pedestrian)	Designed for public moorage, boat access (examples: pedestrian access to recreation areas, parks, communities)	
Heavy Docks, Wharves and Facilities			Includes physical structure, improvements including permanent ways, boat houses, offices and businesses, and walkway ramp or other pedestrian linkage to upland. Structure may include fill, pile or float based designs Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
	Commercial	Commercial moorage and associated ancillary structures including boathouses, marine ways, docks for boat sales, rentals and charters, restaurants, bait shops Moorage of a boat as temporary or permanent live-aboard facility is not permitted	
	Industrial	Designed for regular vehicle use, may include storage, commercial	Includes physical structure improvements including permanent

Use	Sub Use	Description	General Category Parameters
		facilities such as fish processing plants	ways, boat house, office, storage, warehouse, industrial facilities and vehicle and pedestrian access from upland. Structure may include fill, pile or float based designs Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
	Public (Vehicle)	Designed primarily for ferry access, structure intended to support regular vehicle traffic	
Log Booming Ground		Designed for the storage and sorting of logs in the marine environment	Category limited to booming structures and related anchor devices Structure may include pile or float based designs Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
Log Handling Facilities		Designed to permit transfer of logs to and from the marine environment to facilitate sorting, transportation and processing	Includes physical structure and modifications of Intertidal area to support related activities Structure normally based upon fill and may include permanent ways or ramps Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
Helicopter Log Drops		Permits the safe transfer of logs to the marine environment from the air	Tenure typically only required for long duration activities (greater than single season use) Minimum depth is primary siting consideration
Marine Residential		Structures consistent with single family dwellings occupied on a seasonal or continuous basis.	Includes physical structure, improvements including permanent private ways, boat house and walkway ramp or other pedestrian linkage to upland. Structure may include pile or float based designs Category does not address fuel storage, waste disposal or other marine impacts not specific to structure alone
Floating Lodges and Base Camps		Continuous or seasonal occupation of foreshore areas for boat haul out, camping and related activities and access to camping on adjacent upland Continuous seasonal moorage of floating camps or mother-ships camps or structures on pilings or floats, including docks associated with floating lodges and base camps	
Boat Launches		Ramp or rail system (way) used to deliver boats to and remove them from water	Includes fill based ramps, rail ways
Commercial Recreation Guiding		Extensive commercial recreation guiding operations, including kayaking, diving, wildlife viewing and other eco-tourism.	Category is limited to seasonal occupation of areas across a guiding region Minor modifications are acceptable on a seasonal basis provided they serve to contain or reduce overall impact of activities (example: toilet facilities, fire pits, etc)

Use	Sub Use	Description	General Category Parameters
Marine Telecommunications and Utilities		Underwater hydro, telephone, utility right of way, floating and foreshore wave energy generating facilities	Category does not address waste disposal or other marine impacts not specific to structure alone
Conservation		Use for conservation of cultural and recreational resources, marine ecosystem or fish habitat; includes areas required for scientific and research purposes. Existing regional and local parks, Land Act reserves or notations of interest for conservation; and existing provincial parks, ecological reserves, conservation or protection areas.	Category focuses on non consumptive uses and minimal modifications to the environment Structures necessary to fulfill the intent of the area and address safety concerns

Table 13. Foreshore and Nearshore Activities

Activity Category	**Description**
First Nations Use	Traditional and existing uses including sustenance, spiritual, ceremonial; heritage sites & routes NOTE: The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation if specific development applications are accepted for processing
Commercial Fisheries	Fishing by vessel using a variety of gear-types in accordance with federal regulations, licenses and openings. Includes commercial clam and shellfish harvesting, and commercial crab, prawn and shrimp harvesting under license
Public Recreation	Wildlife viewing (non-commercial); swimming; kayak staging & landing areas; surfing; scuba diving; birding. Sport fishing angling; fly-fishing; public harvesting of shellfish. Power boat, sailboat, canoe and kayak routes.
Marine Transportation	Tow, barge, freighter, ferry, and cruise ship routes

Use and Activity Recommendations

LWBC is the provincial agency responsible for administering Land Act and Water Act tenures. LWBC uses a variety of tenure types and tenure programs to manage the uses listed in Table 12. Users of this Plan should be aware that LWBC tenure programs do not exactly correspond with the uses listed in Table 12. This is because some tenure programs may apply to a very broad range of undertakings (i.e. year round or seasonal commercial uses), and because some uses may require more that one type of tenure. Additional information on Provincial Land and Water tenures as well as file numbers for specific tenure locations can be accessed by contacting LWBC.

This Plan makes recommendations regarding the acceptability of the uses listed in Table 12 for each planning unit. Acceptability of uses is addressed according to the following scheme.

Table 14. Use and Activity Recommendation Scheme

✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit
The Plan provides a variation process for uses marked as X or O under certain circumstances and conditions.	

Management Provisions: Conditions and Guidelines

For each unit, management provisions are identified to provide guidance on addressing concerns, conflicts, competition, information needs and capacity issues within the planning unit.

The final determination of unit recommendations has been influenced by knowledge, information and advice from government agencies, First Nations, area residents, and other interested parties.

Each planning unit has two types of provisions. The first set of provisions for each planning unit is conditions for acceptance of tenure application (condition). Each condition corresponds to a particular tenured use and is intended for LWBC as an intitial test for tenures before they are accepted for processing. Examples of conditions include recommendations not to accept any application proposing development in a specific area known to have sensitive environmental values or to accept applications for a given type of use only where it is replacing an existing facility undergoing decommissioning. The second set of provisions are tenure approval and management guidelines (guidelines) is intended to provide recommendations to LWBC for specific aspects of the referral process or to provide additional guidelines for specific types uses. Together conditions and guidelines serve to inform agencies as well as proponents for tenured uses; of the potential issues and related requirements a proposed development is likely to be required to address to receive approval.

Management Emphasis

Based on what is known about the distribution of biological values and human uses patterns, each planning unit is assigned a "management emphasis" category as detailed in Table 15. These categories represent a characteristic "flavour" of existing values and uses, level of development, and opportunities. An emphasis category is not intended to be interpreted as a conventional land use designation or zoning category, since existing and recommended uses and activities will not necessarily be the same for all units assigned the same management emphasis.

Table 15. Management Emphasis Categories

Conservation Emphasis
Units predominated by or adjacent to significant marine ecological or cultural features and values, including existing terrestrial or marine protected areas (or proposed areas) and areas withdrawn or reserved from disposition for conservation values.
Activities and tenured uses should be compatible with and sensitive to conservation values in the unit or on adjacent upland.
Preferred future uses are those that would be compatible with the conservation and cultural values and features on which the unit emphasis is based.
Management mechanisms applied in these units include: compatible or complementary uses only; special management and siting criteria; further investigation for marine protection designation; and reserves or notations of interest to ensure tenure applications are compatible with values.
Recreation Emphasis
Units predominated by public and commercial recreational activities, significant features and opportunities, including areas withdrawn or reserved from disposition for recreation values. Often adjacent to significant terrestrial or marine protection areas (or proposed areas) with high recreation values.
Recreational values, opportunities and experiences should be maintained and/or encouraged.
Other activities and tenured used should be sensitive to recreational values and experiences, particularly in key seasons or periods.
Preferred future uses are those that would be compatible with the recreation values and features on which the unit emphasis is based.
Management mechanisms applied in these units include: compatible or complementary uses only; special management provisions and codes of practice to minimize impact or conflict during recreational seasons; and reserves or notations of interest to ensure tenure applications are compatible with values.
Community Emphasis
Units predominated by a concentration of multiple uses and activities that are associated with adjacent floating or upland settlement. Typically includes combinations of commercial, industrial, community and public institutional uses, private moorage and rural development.
A variety of uses is maintained and/or encouraged in these areas, and most uses should be compatible.
Non-commercial activities and tenured uses should be undertaken with the expectation that they will not interfere with or impede existing uses and activities.
Management mechanisms applied in these units include: special management provisions and codes of practice to minimize conflict; reserving of specific opportunity areas for future tenure; and provisions to minimize impact of development or preclude development in specific areas.
General Marine Emphasis
Units characterized by relatively remote locations with limited uses and / or development potential, with ongoing marine transportation and navigation activities and commercial and recreational fishery activities.
Units include sporadic and discrete provincially tenured uses such as log handling facilities.
Preferred uses are those that would be compatible with ongoing activities and existing uses.
Management mechanisms applied in these units include: special management provisions to maintain fisheries access and navigation requirements; use of standard codes of practice and tenure provisions; and provisions to minimize impact of development or preclude development in specific areas.

3.10 Planning Unit Direction

The description provides a brief overview of the Plan Unit including length of shoreline and overall marine area. Special features are also identified.

The map indicates the general location of the Planning Unit.

Unit 1 Upper Holberg

Description

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Fusce ullamcorper, purus vitae dictum malesuada, sapien dolor mollis tellus, sit amet convallis nisl felis nec lectus. Pellentesque sit amet urna. Nullam susc massa eget eros. Praesent imperdiet arcu at sapien. Donec non turpis gravida augue tristique egestas. Maecenas vehicula, [illegible] elementum ante velit a turpis. Nulla [illegible] non nunc blandit varius. Aliquam odio. Sed vel lacus a neque adipiscing vestibulum.

Derived from the BC Marine Ecounit Classification, provides a summary of biophysical conditions that may influence biological diversity and habitat types. Ecounit: A is an administrative tool to support analysis of ecounits where ecounit boundaries and planning unit boundaries do not coincide. PFMA refers to the DFO Pacific Fishery Management Area and Sub area. Refer to Section 2.2 for more details

Ecounit Profile

Ecounit : A	**PFMA:** 27-11
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- Etiam enim massa,
- molestie eget, consequat non, interdum quis, nulla.
- Mauris convallis. In imperdiet. Praesent accumsan vestibulum lacus.

This section has been developed in conjunction with DFO staff to identify geographic areas that are unique, sensitive to disturbance and/or include critical or high value habitat. Refer to Section 2.5 for more details

Unit Attributes

- Nulla eget erat et pede dapibus varius.
- Aliquam pellentesque, metus et convallis imperdiet, velit tellus mollis dui, sed lacinia dolor wisi ac diam.
- Curabitur pulvinar molestie ante.
- Donec nibh. Etiam molestie varius est. Ut rhoncus pede vel enim.
- Morbi vestibulum blandit eros. Sed mollis molestie velit.
- Ut pretium libero sed urna. Vestibulum ut lectus. Proin vitae enim at nunc suscipit [illegible]
- Fusce libero pede, ultrices non, [illegible] amet, nibh.
- Ut mauris magna, eleifend eget, laoreet ut, scelerisque nonummy, lacus. Duis erat.
- In enim. Pellentesque diam arcu, bibendum ut, laoreet vitae, convallis vitae, nunc.
- Donec eu quam. Pellentesque ultrices. Nulla dolor [illegible] arcu.
- Curabitur et turpis [illegible] Sed

Unit Attributes are drawn primarily from provincial and participating federal agency GIS databases. Attributes are limited to physical and biological features or characteristics. Relative Importance (RI) is the comparative value of a specific resource occurrence in terms of biological function (Bio), commercial (Comm) and Recreational (Rec) harvest. Where not otherwise stated RI refers to biological function. Local knowledge is identified with an asterisk until validated. Refer to Sections 2.3 and 2.6 for more details

First Nations

- Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae;
- Maecenas pede nunc, laoreet vitae, blandit a, mattis eu, dolor.
- Maecenas quis odio ac nibh tincidunt eleifend.

Identifies values specific to the Quatsino First Nation. Note uses may include both current and historic practices. Contact the Quatsino First Nation for more details

Current Uses & Activities

- Nulla ultrices interdum diam.
- Sed condimentum, diam a consectetuer volutpat, sem purus molestie nunc, sed sodales diam est sed augue

The Uses and Activities category is intended to provide a summary of known uses (provincially managed) and activities (non tenured or managed by another level of government) and are drawn primarily from provincial GIS databases. Biophysical capability for aquaculture is also included. Local knowledge is identified with an asterisk until validated.

Issues and Concerns

- Donec sapien. Suspendisse sed mauris. Donec eget lorem. Aenean vitae tortor vitae sapien cursus ultricies.

Coastal Management Goals

- Mauris diam sem, ultrices at, venenatis sit [illegible]
- Proin quis neque. Nam tortor. Cras orci magna, tincidunt molestie, ultrices in, molestie vitae

Coastal Management Goals address elements of the federal Integrated Coastal Management program including Marine Environmental Quality indicators

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
✓	Shellfish Beach Aquaculture	✓	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	✓	Log Handling Facilities
X	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
✓	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launches	✓	Marine Telecommunications and Utilities
O	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation
Code			
✓	Acceptable. The use is considered acceptable a… for processing and evaluation. Acceptance of an… approved. Applications for this use s… es not guarantee that a ten…		
O	Conditionally Acceptable. The use is considered… should be accepted for processing and evaluati… Provisions in the Plan. cceptable. New applications fo… eet the terms of relevant Management		
X	Not Acceptable. The use is considered i… opr… processing and evaluation.		
P	The non-tenured activity is present… d ongoing in the Plannir…		
A	The non-tenured activity is absent from the Planning Unit		
The Plan provides a variation process for uses marked as X or O u…			

Provincially managed uses are assessed for their acceptability within the planning unit. Refer to Section 3.5 and 3.6 and Tables 6, 7 and 8 for more information about these categories and the process for determining acceptability. It is important to note that an acceptable rating does not mean that tenure approval is guaranteed, only that the application should be accepted by Land & Water BC Inc. for referral. For aquaculture, acceptability is limited to those areas identified as good to moderate capability on unit maps.

Refer to Section 5.8 for details of the variation process.

Refer to Table 9 for details regarding management emphasis categories. These categories do not represent zoning but are rather intended to provide a general flavour of the current range of uses and activities and a general sense of future opportunities. Note that any use could potentially occur in any planning unit regardless of emphasis; management provisions will vary depending on the combination of biological attributes and ongoing human uses and activities.

- **Management Emphasis – General M…**
  ornare, mi a dapibus elementum, elit lectus fringilla pe…

Conditions for Acceptance of Tenure Application

- Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
- Fusce ullamcorper, purus vitae dictum malesuada, sapien dolor mollis tellus, sit amet convallis nisl felis nec lectus.
- Pellentesque sit amet urna. Nullam suscipit, est at element… eget eros.
- Praesent imperdiet arcu at sapien. Donec non turpis gravi…

Conditions for Acceptance provisions serve to modify acceptability recommendations to the specific conditions within each Planning Unit including the area where an acceptable use may proceed or the conditions that a "conditionally acceptable use" should address.

Tenure Approval and Management Guidelines

- Maecenas vehicula, purus at pharetra… sidunt, mi magna c… ementum ante velit a turpis. Nulla ut enim. Proin ullamcorper justo nec est.

Required Action

- Sed nisl nisl, vehicula at, egestas vel, di…

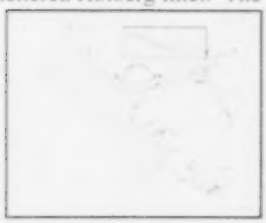
Tenure Approval and Management Guidelines include recommendations for referrals to specific agencies or organisation as well as general recommendations that may span a number of different types of tenures.

The Required Action category identifies tasks for follow-up and implementation. Refer to Section 5 for more details

Unit 1 Upper Holberg

Description

This unit comprises 2,968 ha and 72.4 km of shoreline and includes the majority of the narrow, sheltered Holberg Inlet. The community of Holberg is situated at the western end of the unit adjacent to the Goodspeed River Estuary. Along the southern shore, the land is rugged and slopes to the water while the northern shore slopes more gently and is marked by numerous fluvial fan-deltas. Significant volumes of freshwater winter runoff cause a freshwater lens to form over the denser seawater at the head of the Inlet. This lens may normally extend to 3m in depth and has been recorded to depths of 5m to 7m. Although isolated from ocean conditions; the orientation of Holberg Inlet makes it susceptible to the build-up of steep waves during southeast wind episodes.



Ecounit Profile

Ecounit :A	**PFMA**: 27-11
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- Straggling Islands:
  - high biodiversity and productivity
  - marine mammal usage, large seal population
  - transient killer whale feeding area
- Goodspeed Estuary
  - Year round habitat for migratory birds including blue listed species
  - Salmon spawning and rearing area
  - High productivity

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds. Goodspeed Estuary provides year-round habitat for gulls, dabbling and diving ducks, swans and geese The area from Cleskagh Creek to Wakalish Creek provides fall and winter habitat for gulls, dabbling and diving ducks (including the provincially blue-listed Surf Scoter) geese (including the provincially blue-listed Canada Goose)and swans.
- 10 salmon streams identified: chum, coho, pink
- Estuary: 252 ha, intertidal sand flat 107 ha, sand and gravel flat 53 ha
- Clam beds: 171 ha. littleneck, manila (Bio RI:3,4; Comm:2)
- Eelgrass: approx 131 ha (RI:3)
- Kelp: approx 17 ha (RI:3)
- Herring spawn segments: 7.2 km (RI:1)
- Red/blue listed species: Desmarestia tortuosa marine algae located in the subtidal waters of Orr Island

First Nations:

Information is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserve: (2)
  - Pa-cat'l-lin-ne
  - Toh-quo-eugh
- Traditional and Historic Uses:
  - nearshore and intertidal subsistence food gathering – Clesklagh Ck, Hushamu Ck to Henriksen Pt, Wakalish Ck estuary, Jules Bay, Apple Bay
  - upland hunting – Norton Pt to Clesklagh Ck (north shore), Dahlstrom Pt to opposite - Clesklagh Ck (south shore)
  - Coho fishery – Straggling Islands to Hushamu Ck (entire portion of inlet)
  - Herring roe harvest – Orr Island to Coal Harbour

Current Uses & Activities:

- Finfish aquaculture opportunity: limited OA1 near Norton Pt (approx 22 ha – moderate potential only), some OA2 (approx 67 ha)
- Shellfish deepwater aquaculture opportunity: good oyster only, scallops not advisable (approx 735ha oyster)
- Shellfish beach aquaculture opportunity: good clam and oyster at Clesklagh Ck, Norton and Henriksen Points and Apple Bay; additional good oyster at Pegatem and Hushamu Cks; additional good clam at East Jules Bay. (Approx 151ha oyster, 147ha clam total)
- DFO Interim rockfish conservation area: Holberg extending from Norton Pt and Dahlstrom Pt east to a line directly north from Thorp Pt – fishing limited to

** denotes local knowledge*

dive, handpicking or trap. No other recreational fishing activities
- DFO year round sanitary shellfish closures: Apple Bay (Nuknimish Ck Estuary), Goodspeed Estuary, Jules Bay
- Shellfish aquaculture (2) located in Apple Bay at Henriksen Pt
- Commercial recreation (1) community outdoor recreation
- Commercial A (1)
- Log handling, storage and infrastructure (5)
- Boat launch (1)
- Campground
- Prawn harvest 945 ha (RI:3)
- Commercial Pilchard Fishery
- Commercial Crab Fishery – entire unit
- Recreational fishing : Jules Cove, Straggling Island

Issues and Concerns

- The level of commercial crab harvesting at the head of Holberg Inlet is perceived to alienate recreational opportunities

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

- Commercial recreation guiding could negatively impact public recreation opportunities due to saturation and limitations to access

Tenured Uses			
✓	Shellfish Beach Aquaculture	✓	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	✓	Log Handling Facilities
X	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
O	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launches	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit
The Plan provides a variation process for uses marked as X or O under certain circumstances and conditions.	

Conditions for Acceptance of Tenure Application

Management Emphasis – General Marine This unit should be managed to support a range of activity and uses while conserving environmental quality and habitat values associated with estauries and stream deltas.

- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

- Applications for tenure that would result in modification of stream deltas including alteration of stream flow or stream orientation should not be accepted.
- Applications for tenure that would result in modification of Goodspeed Estuary should not be ccepted

Tenure Approval and Management Guidelines

- Applications for tenure that include Straggling Islands, Waskalish, Clesklagh, Nuknimish Ck and Jules Bay estuaries and from Henriksen Pt to Hushamu Ck should include a letter of support from the Quatsino First Nation.
- Tenures requiring 24 hour on site supervision (ex. finfish aquaculture) should be permitted to include staff quarters within tenure boundaries.
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of provincially blue-listed Surf Scoter) geese (including the provincially blue-listed Canada Goose

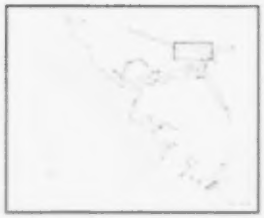
Required Action

- Applications for commercial and industrial use within the unit should be referred to CWS.
- Assess native shellfish beaches within Plan Area to ensure that requirements for commercial and recreational harvesting and biological functioning are met before permitting conversion of beds to aquaculture

Unit 2 Lower Holberg

Description

This unit comprises 1,760 ha and 15 km of shoreline. It represents the majority of the lower third of Holberg Inlet. Water depth is considerably deeper than in the remainder of Holberg Inlet. The shoreline is dominated by rock with gravel beaches and rock cliffs while water depth is greater than elsewhere in the inlet.



Ecounit Profile

Ecounit : B	**PFMA:** 27-11
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	Mid-depth (50-200m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- None identified

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds. The northern portion of the unit provides fall and winter habitat for gulls, dabbling and diving ducks (including the provincially blue-listed Surf Scoter) geese (including the provincially blue-listed Canada Goose) and swans.
- 1 salmon stream identified: chum, coho
- Clam bed: 9 ha. Littleneck, manila (Bio RI:2,3; Comm:2)
- Herring spawn segments: 14km (RI:1)

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Plant gathering: vicinity of Thorp Point
  - Chum/Coho salmon fishery: Thorp Pt to Stewart Pt (in unit 3)

Current Uses & Activities

- Finfish aquaculture opportunity: OA1 only (approx 516 ha)
- Shellfish deepwater aquaculture opportunity: good oyster throughout, scallops not recommended (approx 1435 ha total)
- Shellfish beach aquaculture opportunity: medium for clam and oyster (approx 3.6 ha total)
- Salmon farm (1) 42 ha Thorpe Point
- Prawn harvest 756 ha (RI:3)
- Log handling (2)
- Canoe/kayak route
- Submerged cables (3) telecommunication(2), electrical power

Issues and Concerns

- High currents due to proximity Narrows results in increased navigational challenges. Structures extending beyond the intertidal may conflict with marine transport

Coastal Management Goals

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Use Recommendations (Based on "Acceptability")

Tenured Uses			
X	Shellfish Beach Aquaculture	✓	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
✓	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	X	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
O	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launches	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit
The Plan provides a variation process for uses marked as X or O under certain circumstances and conditions.	

Conditions for Acceptance of Tenure Applications

Management Emphasis - General Marine This unit should be managed to provide for a range of development opportunities.

- Log handling uses should be limited to current levels of use. Applications for Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.

Tenure Approval and Management Guidelines

- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.
- Applications for tenure that alienate identified prawn harvesting areas should not be accepted
- Tenures requiring 24 hour on site supervision (ex. finfish aquaculture) should be permitted to include staff quarters within tenure boundaries.
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat.

Required Action

- Commercial and industrial use applications within the unit should be referred to CWS.

Unit 3 Coal Harbour

Description:

This unit of approximately 238 ha and 8.1 km of shoreline centres on the community of Coal Harbour. The shoreline consists of sand and gravel beach and flats. The shallow nearshore area is punctuated by several piers, including one in ruins, and two beached hulks. This unit includes some of the most biologically important clam beds in the Plan Area

Ecounit Profile

Ecounit : A	**PFMA**: 27-11
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- None identified

Areas of Ecological Significance

Unit Attributes: ***Values listed below may include areas of localized ecological significance. Refer to Section 2.5***

- CWS confirmed area of use by migratory birds. Coal Harbour provides winter habitat for gulls and dabbling ducks
- 1 salmon stream identified: chum
- Kelp: 9 ha (RI:3)
- Clam bed; 91 ha. Littleneck, manila (Bio RI:4, Rec:2)
- Shipwrecks (2): eastern shore
- Red/blue listed species: The adjacent upland is habitat of the provincially red-listed Common Water Shrew (Brooksi ssp) and the blue-listed ermine (Anguinae ssp).
- Herring spawn segments:4.5km (RI:1)
- Western portion of Coal Harbour is subject to local zoning by Mount Waddington Regional District (bylaw 669)

First Nations: ***Material is subject to constant review and update. Contact the Quatsino First Nation for more information***

- Traditional and Historic Uses
  - Nearshore and intertidal subsistence food gathering - east side of harbour
  - Chum fishery – mouth of harbour
  - Herring roe harvest – west of Coal Harbour
  - Upland plant gathering – Stephens Creek
  - Upland hunting – inland from Stewart Pt

Current Uses & Activities

- Finfish aquaculture opportunity: very limited OA1 due to siting criteria (approx 2ha total moderate potential only)
- Shellfish deepwater aquaculture opportunity: good oyster and scallop throughout, some concern regarding water quality and marine traffic (approx 239ha oyster, 111ha scallop)
- Shellfish beach aquaculture opportunity: none identified
- Commercial A (2)
- Boat launches (2)
- Log handling sites and associated infrastructure(3)
- Canoe/kayak put-in/take-out
- Recreational boating, canoe/kayak routes
- Recreational fishing: harbour entrance
- Public wharf (1)
- Submerged cables (2) telecommunication, electrical power; abandoned cable (1)
- Sewer/effluent line (1)
- Underwater pipeline

Issues and Concerns

- The impact of nearshore conservation initiatives on upland property rights

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R. et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
O	Shellfish Beach Aquaculture	O	Log Booming Ground
O	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
O	Finfish Aquaculture	X	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
A	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit
The Plan provides a variation process for uses marked as X or O under certain circumstances and conditions.	

Management Emphasis – Community This unit is to be managed to provide for a range of economic opportunities while maintaining marine transportation routes, and conservation values in the vicinity of Stephens Creek

Conditions for Tenure Application Acceptance

- Applications for shellfish beach and deepwater aquaculture uses should be conditional upon submission of acceptable water quality evaluation reports and/or plans for mitigation.
- Log handling and booming ground operations should be limited to current levels of use. Applications for Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for finfish aquaculture should only be accepted for the opportunity area identified on the unit map.
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.

Tenure Approval and Management Guidelines

- Uses should conform with the Mount Waddington Regional District Zoning bylaw 669, where applicable
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat.
- Commercial and industrial use applications within the unit should be referred to CWS.

Required Action

Unit 4 Rupert Inlet

Description

Rupert Arm is a comparatively short inlet comprising 1,752 ha and 31.8km of shoreline. The northern shore is the site of the former Utah Copper Mine and the shoreline exhibits a relatively high degree of human modification as a consequence. The remaining shoreline shows a fairly broad range of physical variation including the extensive Rupert Creek Estuary and sand and gravel beaches. Rupert Inlet includes both the most highly rated eelgrass beds and clam beds (for biological importance) in the Plan Area

Ecounit Profile

Ecounit :C	**PFMA**: 27-10
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- Coetkkwaus/ Waukwaas Creeks Estuary
  - Critical habitat for blue-listed bird species
  - Important habitat for marine birds during large storm events

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds. Rupert Inlet and Varney Bay provide winter, spring and summer habitat for dabbling and diving ducks (including the provincially blue listed Surf Scoter), gulls, grebes (including the provincially red-listed Western Grebe), loons, alcids (including the provincially red-listed Marbled Murrelet), eagles, herons (including the provincially blue listed Great Blue Heron), swans (including the provincially blue-listed Trumpeter Swan) and geese (including provincially blue-listed Canada Goose).
- Estuary: 44 ha
- Intertidal sand flat: 89 ha
- 4 salmon streams chum, coho, pink, steelhead
- Eelgrass: 11 ha (RI:3); 89 ha (RI:4)
- Clam beds; 290 ha. Littleneck, manila (Bio RI:4,5, Rec:2,3)
- Adjacent protected area: Marble River Provincial Park

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Chum, coho and pink salmon fisheries throughout
  - Spring salmon fishery in vicinity of Harkin Pt to Varney Bay

Current Uses & Activities

- Finfish aquaculture opportunity: OA1 (approx 1ha-moderate potential only)
- Shellfish Deepwater aquaculture opportunity: good oyster, medium scallop (approx 1752ha oyster, 1635ha scallops)
- Shellfish beach aquaculture opportunity: good clam and oyster primarily at Coetkwaus Cr and east along southern shore (approx 28ha oysters, 29ha clams)
- Campgrounds (2), Rupert Arm Recreation Site, Camp Henderson Day Use Area
- Boat launch: Rupert Arm
- Recreational fishing: estuary
- Private campground at head of inlet
- Light industrial (1) former Utah mine dock site
- Heavy Industrial (1) former Utah mine site (& waste material)
- Log handling, storage and infrastructure (4)
- Rural residential (1)
- Submerged cable (1): electric power

Issues and Concerns

- Ongoing remediation of BHP mine site and water quality concerns

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing

Coastal Management Goals

- Water quality assessment may help to guide future use, seabed bottom modifications – assessment recommended

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
✓	Shellfish Beach Aquaculture	✓	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	✓	Log Handling Facilities
X	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
✓	Floating Lodges and Base Camps	O	Heavy Docks, Wharves and Facilities
✓	Boat Launch	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation
Code			
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.		
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.		
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.		
P	The non-tenured activity is present and ongoing in the Planning Unit		
A	The non-tenured activity is absent from the Planning Unit		

Management Emphasis – General Marine This unit should be managed to provide for a range of development opportunities while retaining the recreation and conservation values associated with the estuary and south shore beaches

Conditions for Acceptance of Tenure Applications

- Heavy Docks, Wharves and Facilities should be limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.

Tenure Approval and Management Guidelines

- Applications for tenure that would result in modification of Coetkkwas, Waukwaas or Washlawis estuaries should not be accepted.
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Surf Scoters, Great Blue Herons, Trumpeter Swans and Canada Geese
- Commercial and industrial use applications within the unit should be referred to CWS.

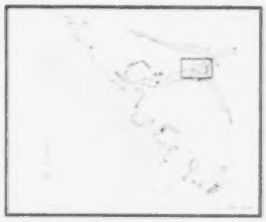
Required Action

- Maintain conservation map reserve over Coetkkwaus and Waukwaas Creek Estuaries
- Establish Tow Boat Reserve in Rupert Inlet as a Notation of Interest under the Land Act in favour of MSRM

Unit 5 Quatsino

Description

Located at the eastern end of Quatsino Sound proper, the northern shoreline of this unit extends 44.4 km, includes the community of Quatsino and encompasses 1,704 ha of marine waters. The unit is bounded to the south by Drake Island. The shoreline is primarily sand or sand and gravel beaches, the majority of these overlying rock platforms and ramps.



Ecounit Profile

Ecounit :C	**PFMA**: 27-9, 11
Substrate	hard
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	sloping (5-20%)
Depth	mid-depth (50-200m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- Quatsino Narrows extending to Quattishe Island
  - High value sea otter area

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds. Hecate Cove provides fall and winter habitat for grebes, gulls and diving ducks. Pamphlet Cove provides very high value spring habitat for mergansers.
- 3 salmon streams: chum, coho, pink
- Kelp: 168 ha (RI:3)
- Clam beds: 76 ha. Littleneck, manila, unknown (Bio RI:1,2,4; NF RI:0,2; Rec RI:1,2,3; Comm:0,2)
- Urchin bed: 17 ha (RI:3)
- Sea cucumber habitat
- Red/blue listed species: (3) Cross Island, Ildstad Island, Quatsino The adjacent upland is habitat of the provincially red-listed Common Water Shrew (Brooksi ssp) and the blue-listed ermine (Anguinae ssp). The marine benthos east of Drake Island and in the vicinity of Ilstad Islands provide habitat for the blue-listed giant swimming scaleworm
- Extensive eagle nesting sites
- Adjacent protected areas: Marble River Provincial Park

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserve 1
  - IR1 Quattishe
- Traditional and Historic Uses
  - Abalone, mussel harvesting areas
  - Spring salmon fishery - Evenson Pt to Quattishe
  - Chum/coho salmon fishery – Drake Island to Bergh Cove
  - Halibut fishery
  - Nearshore and intertidal subsistence food gathering - Hecate Cove
  - Bird hunting – Hecate Cove, Kokwina Cove
  - Upland hunting - Kwokwesta Ck, Hawisnakwi Ck

Current Uses & Activities

- Finfish aquaculture opportunity: OA2 (approx 455 ha))
- Shellfish deepwater aquaculture opportunity: good oyster throughout, scallop potential limited to Hecate Cove (approx 1697ha oysters, 102ha scallops)
- Shellfish beach aquaculture opportunity: very limited medium potential oyster, very limited good potential clam (approx 2ha oyster, 0.5ha clam)
- DFO year round sanitary shellfish closure: Hecate Cove (north of 50°32.73' north latitude), Kokwina Cove (south of 50°31.52' north latitude)
- Prawn harvest: 45 ha (RI:3)
- Recreational fishing: Quatsino Narrows
- Submerged cable: Evenson Point – east of Jesdal Islet
- Public wharf: Bergh Cove
- Commercial/private docks and piers: Bergh Cove, Hecate Cove
- Quatsino Boat yard: Hecate Cove
- Recreational boating, canoe/kayaking
- Pamphlet Cove Boat Haven: 7.9 ha
- UREP: Drake Island

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

- Rural residential: 3
- Log handling, storage and infrastructure: (1)
- Private moorage (1)

- The foreshore adjacent to the community of Quatsino is subject to local zoning by Mount Waddington Regional District (bylaw 670)

Issues and Concerns

- Ilstad Islands are a local camping area.
- Heavy cargo vessels transit Quatsino Sound north of Drake Island
- Viewscape from Quatsino settlement of Drake Island

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
O	Shellfish Beach Aquaculture	O	Log Booming Ground
O	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
X	Finfish Aquaculture	✓	Helicopter Log Drops
X	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	O	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Conditions for Tenure Application Acceptance

Management Emphasis – Community This unit should be managed to maintain the rural residential quality of the Quatsino village settlement while providing opportunities for complementary development

- Shellfish Beach Aquaculture should be limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for deepwater shellfish aquaculture should be accepted only for the southwest potion of the unit, between Newcomb Rocks and Holloway Point on Drake Island

Tenure Approval and Management Guidelines

- Log handling facilities and log booming grounds should be limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Uses should conform to the Mount Waddington Regional District Zoning Bylaw 670, where applicable.
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat.
- Commercial and industrial use applications within the unit should be referred to CWS.

Required Action

- Maintain Pamphlet Cove boat haven as a Notation of Interest under the Land Act in favour of WLAP

Unit 6 Buchholz-Neroutsos

Description

This unit comprising 3,016 ha and 51.2 km of shoreline, extends from Buchholz Channel south of Drake Island to the northern limits of Jeune Landing in Neroutsos Inlet. The land generally slopes steeply to the waters edge, resulting in relatively limited foreshore areas. The shoreline, mainly sand and gravel exhibits some human modification, including a dry land sort and the abandoned Yreka mine site.

Ecounit Profile

Ecounit : E	**PFMA**: 27-7, 8
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	sloping (5-20%)
Depth	mid-depth (50-200m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- Area off Southeast tip of Drake Island –
  - High value sea otter area

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds: The entire south shore of Buchholz Channel provides fall and winter habitat for dabbling ducks, gulls and herons (including the provincially blue-listed great blue heron). Coqueis Creek is rated as high spring habitat value for eagles
- Estuary: 56 ha
- 7 salmon streams: chum, Coho, pink
- Kelp: 82 ha (RI:3)
- Clam beds: 87 ha; littleneck, manila (Bio RI:1,2,3; NF RI:0,2; Rec RI:0,2,3; Comm RI; 0,2,3)
- Red/blue listed species: The adjacent upland is habitat of the provincially red-listed Common Water Shrew (Brooksi ssp) and the blue-listed ermine (Anguinae ssp). The marine benthos is east of Drake Island and in the vicinity of Ilstad Islands provide habitat for the blue-listed giant swimming scaleworm

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Salmon fishery - south of Drake Island
  - Prawn fishery - Kultus Cove
  - Lingcod fishery – Neroutsos Inlet
  - Nearshore and intertidal subsistence food gathering – south shore of Drake near Lakken Pt, Atkins Cove, Klootchlimmis Ck Estuary
  - Upland hunting throughout on southern shore, east and west shores of Neroutsos Inlet

Current Uses & Activities

- Finfish aquaculture opportunity: OA1 Buchholz Channel (approx 500ha – moderate potential only) OA2 limited (approx 27ha total)
- Shellfish deepwater aquaculture opportunity: good oyster and scallop primarily in Kultus Cove(aprox 1914ha oyster, 173ha scallop)
- Shellfish beach aquaculture opportunity: good potential centred on Klootchlimmis Creek (approx 62ha oyster, 47ha clam)
- Prawn harvest 94ha (RI:2), 266ha (RI:3)
- Log handling and storage (5)
- Shellfish deepwater (2) South Drake Island
- Shellfish beach (1) Julian Cove
- Recreational boating, canoe/kayak routes
- Recreational fishing: Kultus Cove, Laaken, Holloway Pt
- Recreational and commercial crab harvesting*

Issues and Concerns

- Buchholz Channel is a primary navigation route
- Tug and barge traffic between Holloway Point and Klootchlimmis Creek Estuary
- Sea otters rafting area at entrance to Neroutsos Inlet*

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
✓	Shellfish Beach Aquaculture	O	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
✓	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Conditions for Tenure Application Acceptance

Management Emphasis - General Marine This unit should be managed to promote aquaculture opportunities while maintaining important marine transportation routes

- Applications for foreshore and nearshore tenures should not be accepted for the area between Holloway Pt (Drake Is) and Klootchlimmis Creek Estuary to ensure adverse weather small boat channel is not compromised.
- Log handling and booming ground operations should be limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.

Tenure Approval and Management Guidelines

- Commercial and industrial use applications within the unit should be referred to CWS.
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Great Blue Herons
- Tenures on south shore of Drake Island should include provision to enable temporary/ emergency tie-ups (safe anchorage)

Required Action

- Establish Tow Boat Reserve southwest of Drake Island as a Notation of Interest under the Land Act in favour of MSRM

Unit 7 Port Alice

Description

This unit comprises 1,761 ha and 45.9 km of shoreline and includes the community of Port Alice and the southern portion of Neroutsos Inlet. The foreshore is relatively narrow due to the steeply sloping nature of the inlet's shoreline. The shore, primarily sand and gravel beaches, exhibits a relatively high degree of human modification. Virtually the entire eastern shoreline of the unit is either privately held or is under tenure.

Ecounit Profile

Ecounit : E	**PFMA**: 27-8
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	sloping (5-20%)
Depth	mid-depth (50-200m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- None Identified

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: Teeta Cr to head of Neroutsos Inlet provides habitat for diving and dabbling ducks, gulls and swans (including provincially blue-listed Trumpeter Swan)
- Estuary: 57 ha
- Intertidal sand flats:32 ha
- 4 salmon streams: Chinook, chum, coho, steelhead
- Eelgrass 62.5 ha (RI:3)
- Clam beds; 61 ha littleneck, manila (Bio RI: 4, Comm RI:2)

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves: 3
  - Cayuse,
  - Teeta,
  - Caylith
- Traditional and Historic Uses
  - Subsistence food harvesting – Teeta Ck estuary
  - Upland plant gathering in vicinity of Cayuse Ck
  - Extensive upland hunting, both shores of Neroutsos inlet

Current Uses & Activities

- Finfish aquaculture opportunity: assessed as not advisable
- Shellfish Deepwater aquaculture opportunity: medium potential only (approx 1760ha oyster and scallop)
- Shellfish beach aquaculture opportunity: very limited good oyster, clam rated at medium only (approx 1ha oyster, 4ha scallop)
- Prawn harvest 462 ha (RI:2), 41ha (RI:3)
- Boat launches(4) Dawson Landing, Port Alice town site, Port Alice Mill, Teeta Creek
- Recreational fishing: Port Alice town site
- Pulp Mill
- Quarry: Jeune Landing
- Commercial B (1) Thurburn Bay
- Commercial A (1) Cayeghle Creek
- Log handling, storage and infrastructure (9)
- Local /regional park (1) Port Alice
- Public Wharf: Jeune Landing
- Submerged water line
- Submerged electrical cable
- Commercial prawn and crab harvest*

Issues and Concerns

- Shellfish deepwater opportunity limited by concerns regarding AOx loading by pulp mill.

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

- Water quality should be monitored in support of future opportunities

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
O	Shellfish Beach Aquaculture	O	Log Booming Ground
O	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
O	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Conditions for Tenure Application Acceptance

Management Emphasis - General Marine This unit should be managed to provide for continuing development centred on Port Alice and Jeune Landing while maintaining important marine transportation routes.

- Log handling and booming ground operations are limited to current levels of use. Applications fornew facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Finfish and shellfish aquaculture applications should be accompanied by an assessment of species suitability to existing water quality
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.

Tenure Approval and Management Guidelines

- Applications for tenure that would result in modification of Cayuse Creek and Cayeghle Creek estuaries should not be accepted
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Trumpeter Swans
- Commercial and industrial use applications within the unit should be referred to CWS.

Required Action

- Establish a Tow Boat Reserve east of Ketchen Island as a Notation of Interest under the Land Act in favour of MSRM

Unit 8 Koprino

Description

Comprising the bulk of Quatsino Sound proper, this unit comprises 5,577 ha and 86.4 km of shoreline. The shoreline of this unit gradually slopes to predominantly rock ramps and platforms overlain by sand and gravel beaches. This unit includes the prawn harvest areas rate of highest relative importance in the Plan Area

Ecounit Profile

Ecounit : F	**PFMA:** 27-7
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	sloping (5-20%)
Depth	mid-depth (50-200m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- Koprino Harbour
  - area of high biodiversity, productivity
  - high value sea otter areas
- Brockton Island to Ilstad Island
  - Sea otter feeding and rafting areas

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: Koprino Harbour provides winter and spring habitat for dabbling and diving ducks, shore birds and geese (including provincially blue-listed Canada Goose). The mouth of the Mahatta River provides very high value summer habitat for gulls. The western extent of the unit provides habitat for storm petrels, gulls, cormorants, alcids and shore birds from spring through fall
- Estuary: 62 ha
- Intertidal sand flats: 32 ha
- 4 salmon streams: Chinook, chum, coho, pink, sockeye, steelhead
- Eelgrass 48 ha(RI:3)
- Kelp: 199 ha (RI:3)
- Clam beds 176 ha butter, little neck, manila (BIO RI;1,2,3; FN RI:0,2; Rec RI:0,1,2 Comm RI;2,3)
- Urchin bed: 69.5 ha (RI:3)
- Herring spawn segments 28.8 km (RI:1)
- Red/blue listed species: The adjacent upland is habitat of the provincially red-listed Common Water Shrew (Brooksi ssp) and the blue-listed ermine (Anguinae ssp). The marine benthos is east of Drake Island and in the vicinity of Ilstad Islands provide habitat for the blue-listed giant swimming scaleworm
- Sea otter rafts between Brockton and Drake Islands

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserve: 3
  - Clatux
  - Mah-te-hicht
  - Koprino

Traditional and Historic Uses

- Nearshore and intertidal subsistence food gathering Koprino Harbour, , Mahatta Ck to Monkey Ck, Nordstrom Cove, Cliffe Pt.
- Salmon Fishery – Koprino Harbour
- Prawn fishery – Brockton Island to Koskimo Island
- Upland bird hunting – throughout, along shoreline

Current Uses & Activities

- Finfish aquaculture opportunity: OA1 west of Brockton island (approx 1489ha – moderate potential only), elsewhere OA2: (approx 476ha)
- Shellfish Deepwater aquaculture opportunity: good scallop and oyster potential Koprino Harbour, good oyster potential east of Brockton Island (approx 2350ha oyster, 396ha scallop)
- Shellfish beach aquaculture opportunity: good oyster and clam in Koprino estuary, additional good clam in Mahatta Creek estuary (approx 85ha oyster, 141ha clam)
- DFO year round Shellfish Sanitary closure: Cleagh Creek (bay between headlands), Mahatta River (800m radius from mouth of Monkey Ck), Koprino Harbour (north of Schloss Island)

* *denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

- 5 salmon farms
- Prawn harvest 277 ha (RI:2), 751 (RI:3), 402ha (RI:4)
- Spencer Cove Recreational Site: campsite
- Quatsino Provincial Park
- Boat launch: Spencer Cove
- Log handling and storage: 7
- Recreational fishing: Spencer Cove, Monday Rocks to Bedwell Island
- Recreational boating, canoe/kayak route
- Shellfish aquaculture (1) Koskimo Bay
- Commercial A (2)
- Recreational residential (1) Malcolm Island

Issues and Concerns

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
✓	Shellfish Beach Aquaculture	O	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
O	Finfish Aquaculture	✓	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
O	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis - General Marine This unit should be managed to maintain existing range of uses and activities

Conditions for Tenure Application Acceptance

- Finfish applications should be considered for limited tenure modifications, such as anchoring requirements, for waste management regulation requirements, and for establishment of fallow sites associated with existing farms. New salmon aquaculture farms should not be accepted.
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.
- Log handling and booming ground operations should be limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for tenure in Koprino Harbour should include a letter of support from the Quatsino First Nation

Tenure Approval and Management Guidelines

- Applications for tenure that would result in modification of Kewquodie Creek estuary should not be accepted
- Applications for tenure that would alientate identified prawn harvesting areas should not be accepted

- Tenures requiring 24 hour on site supervision (ex. finfish aquaculture) should be permitted to include staff quarters within tenure boundaries.
- Commercial recreation guiding use of this unit are conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Canada Geese

Required Action

- Commercial and industrial use applications within the unit should be referred to CWS.
- Establish Tow Boat Reserves west of Ilstad Island and west of Mahatta River as Notations of Interest under the Land Act in favour of MSRM

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Unit 9 Winter Harbour

Description

Winter Harbour is a narrow, sheltered and shallow inlet comprising 1,777 ha and 73.4 km of shoreline. East of Wedel Island, marine waters are reduced to a narrow channel through muddy shoals before opening into Ahwhichaolta inlet. The town site of Winter Harbour is marked by numerous docks and piers. The shoreline flattens considerably north of Hazard Point and includes the greatest extent of sand flats in the Plan Area. Browning Inlet which branches off of Forward Inlet northwest of Matthew Island is a narrow and shallow area marked by a drying flat at its head. This unit includes the majority of high importance herring spawn areas in the Plan Area.

Ecounit Profile

Ecounit : G	**PFMA**: 27-3
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- Ahwhichalto Inlet
  - unique shallow, low flushing inlet with unique species composition
- Browning Inlet tidal marshes
  - Intertidal salt marsh with unique species composition
- Mouth of Winter Harbour
  - Sea otter, sea lions at Hazard Point

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed are of use by migratory birds: The entire unit provides habitat for grebes (including provincially red-listed western grebe), diving and dabbling ducks, swans, mergansers, eagles, loons and alcids (including the provincially red-listed marbled murrelets)
- Estuary 26 ha
- Intertidal mud flats: 91 ha
- 11 salmon streams: chum, coho, pink
- eelgrass: 121 ha (RI:3)
- kelp: 112 ha (RI:3)
- clam beds: 110 ha: butter, littleneck, manila (Bio RI:3; NF RI:0,2; Rec RI:0,2; Comm RI:2,3)
- herring spawn segments: 9.7 km (RI:1), 14 km (RI:2),9.3 km (RI:3) 4.9 km (RI:4)
- high invertebrate values*

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves (5)
  - Clienna,
  - Quatleyo
  - O-ya-kum-la
  - Ah-we-cha-ol-to
  - Grass Point
  - Pulcah
- Traditional and Historic Uses
  - Salmon Fishery: Forward Inlet Montgomery Pt to Hazard Pt
  - Nearshore and intertidal subsistence food gathering – Hunt islets to Greenwood Pt
  - Herring Roe harvest - Kains Pt to Forward Inlet, Flint Rock to Greenwood Pt
  - Seabird egg harvesting - Quashtin Ck estuary
  - Upland plant gathering – Winter Harbour

Current Uses & Activities

- Finfish aquaculture opportunity: OA2 Ahwichaolto Inlet (approx 86ha)
- Shellfish Deepwater aquaculture opportunity: good scallop and oyster Greenwood Point to Wedel Island, some concern on water quality in vicinity of Winter Harbour; good oyster capability in Forward Inlet (approx 526ha oyster, 321ha scallop)
- Shellfish beach aquaculture opportunity: good clam and oyster north shore of Winter Harbour from Wedel Island to Ahwhichaolto Inlet, some concern regarding water quality; good clam potential, north shore of Browning Inlet (approx 111ha oyster, 148ha clam)
- DFO year round sanitary shellfish closure: Winter Harbour, waters north of Wedel Island
- Public wharf
- Boat launch
- Log handling and storage (1)
- Kwaksistah Regional Park
- Shellfish Aquaculture: (1)
- Commercial tenures (6)

** denotes local knowledge*

- Light industrial (1)
- Private Moorage (2)
- Submerged electrical cable (1)
- Sewer/effluent line (1)
- Roe on kelp harvesting (2 operations)*
- commercial urchin and sea cucumber fisheries*
- recreational and commercial crabbing*
- recreational hiking at Forward Inlet*

Coastal Management Goals

Issues and Concerns

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
✓	Shellfish Beach Aquaculture	O	Log Booming Ground
✓	Shellfish Deepwater Aquaculture	O	Log Handling Facilities
X	Finfish Aquaculture	O	Helicopter Log Drops
O	Marine Plant Aquaculture	✓	Private Residential Moorage
X	Marine Residential	✓	Light Docks, Wharves and Facilities
O	Floating Lodges and Base Camps	✓	Heavy Docks, Wharves and Facilities
✓	Boat Launch	✓	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – **General Marine** This unit should be managed to accommodate a range of development while maintaining the recreational appeal of the village of Winter Harbour .

Conditions for Tenure Application Acceptance

- Floating lodges and base camps should limited to current levels of use. Applications for new facilities should not be accepted except to replace an existing operation undergoing decommissioning.
- Applications for marine plant aquaculture use should be limited to those species for which scallop capability is an appropriate surrogate. Consideration of applications for the harvesting of other species should be dependent on the submission of species specific background information and capability summary with submission of application for tenure or permit.
- Applications for helicopter log drops should be limited to Forward Inlet south of Hazard Point
- Applications for tenure that would result in modificiation of Forward Inlet estuary or the channel to Ahwhichaolto Inlet should not be accepted.

Tenure Approval and Management Guidelines

- Uses should conform with the Mount Waddington Regional District Regional Zoning Bylaw 21, where applicable
- Commercial recreation guiding use of this unit are conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the red-listed Western Grebe and Marbled Murrelets

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Required Action

- Development east of Wedel Island should avoid clam beaches and eel grass beds
- Commercial and industrial use applications within the unit should be referred to CWS.
- Establish Land Act Notation of Interest for Browning Inlet tidal salt marsh in favour of WLAP and CWS for marine conservation and protection purposes.

Unit 10 San Josef – Cape Parkins

Description

Encompassing 14,047 ha and 78 km of shoreline this unit extends north from Quatsino Sound to San Josef Bay and represents a rugged high energy environment. Exposed to the open Pacific Ocean, the shoreline is almost entirely composed of rock cliffs and platforms, some overlain by sand and gravel beaches. Numerous sandy pocket beaches dot the shore. The highest rated (RI) kelp beds in the Plan Area occur in this unit.

Ecounit Profile

Ecounit : H-K	**PFMA**: 27-2
Substrate	hard
Exposure	high (fetch >500km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	cool to warm (varies from <9°C to9-15°C)

Areas of Ecological Significance

- Cape Scott to Triangle Island
  - critical bird values
  - bird rearing habitat for endangered species
  - isolated and retained in natural state with protected upland

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: The coastline of this unit provides overwintering (fall through spring) habitat for dabbling ducks, cormorants, alcids and swans.
- Kelp: 156 ha (RI:3), 195 ha (RI:4), 382 ha (RI:5)
- Herring spawn segments: 15.2 km (RI:1)
- Adjacent protected areas: Raft Cove Provincial Park, Cape Scott Provincial Park
- Red-listed marine algae Laminaria sinclairii found in the low interdial zone typically among rocks and boulders at Commerell Point (Raft Cove Park) and near Lippy Point.
- Blue-listed marine algae Percursaia dawsonii found on Kains Island
- Rockfish protection area extends northward from Topknot point
- Seal/Sea otter – Pinnacle Island *

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Nearshore and intertidal subsistence food gathering – Cape Parkins to Kains Pt, McAllister It
  - Halibut fishery - Grant Bay
  - Culturally Modified Trees - Grant Bay

Current Uses & Activities

- Finfish aquaculture opportunity : limited OA1 near entrance to Forward Inlet (117 ha)
- Shellfish Deepwater aquaculture opportunity: limited survey conducted in this area; rated not advisable
- Shellfish beach aquaculture opportunity: no survey data
- Recreational sites: Cape Palmerston Rec Site, Hecht Beach Trail, Grant Bay & Trail
- Proposed rockfish conservation area - Topknot
- Kains Island Light Station
- Crab harvesting – Grant Bay *
- Temporary anchorage east of Kains Island
- Offshore gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Shell Canada
- LWBC Planning/marketing/Development Project(1)
- Commercial Recreation (1)

Issues and Concerns

- Grant Bay – high value recreational opportunity – upland deferred from development for recreational purposes

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations (Based on "Acceptability")

Tenured Uses			
X	Shellfish Beach Aquaculture	X	Log Booming Ground
X	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	X	Helicopter Log Drops
X	Marine Plant Aquaculture	X	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
X	Boat Launches	O	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – Conservation This unit should be managed with the intent of minimising impact of development on conservation values and recreational opportunities

Conditions for Tenure Application Acceptance

Tenure Approval and Management Guidelines

- Applications for marine telecommunications and utilities usage should be limited to green energy initiatives and be conditional upon meeting visual impact concern of local community
- Grant Bay should be excluded from commercial recreation guiding areas
- Commercial recreation guiding use of this unit are conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat.
- Impacts of development should be mitigated where it alienates identified habitat of Laminaria sinclairii or Percursaia dawsonii.

Action Required

- Establish a Land Act notation of interest for Grant Bay foreshore in favour of WLAP for public recreation

Unit 11 Quatsino Entrance

Description

The high degree of benthic relief marks this planning unit as unique along the western shore of Vancouver Island. Primarily marine, this unit encompasses 5,975 ha but only 6.7km of shoreline The shoreline, consisting of the Gillam Islands group and the shoreline between Harvey Cove and Cliffe Point, is comprised of rock cliffs and intertidal rock platforms, either bare or overlain by sand and gravel beach.

Ecounit Profile

Ecounit : L	**PFMA:** 27-2
Substrate	hard
Exposure	high (fetch >500km)
Current	low (<3kn)
Roughness	high
Slope	flat (0-5%)
Depth	mid-depth (50-200m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- Gillam Islands
  - identified as critical bird breeding habitat
  - seal and sea lion haul out area
  - area of high biodiversity and productivity

Unit Attributes: *Values listed below may include areas of localized ecological significance. Refer to Section 2.5*

- CWS confirmed area of use by migratory birds: Gillam Islands are breeding sites for Fork-tailed and Leach's Storm-Petrel (second largest storm-petrel colony in BC), Glaucous-winged Gulls, provincially red-listed Pelagic Cormorants, Pigeon Guillemots, provincially blue-listed Tufted Puffins and Black Oystercatchers. The area provides overwintering habitat (fall through spring) for storm-petrels, gulls, cormorants, alcids and shore birds.
- Kelp: 16.5 ha (RI:3)
- Holding area for salmon*

First Nations: *Material is subject to constant review and update. Contact the Quatsino First Nation for more*

- Traditional and Historic Uses
  - Seabird egg gathering
  - Halibut fishery
  - Cod fishery
  - Nearshore and intertidal subsistence food gathering – Cliffe Pt

Current Uses & Activities

- Finfish aquaculture opportunity : considerable OA1 potential between Gillam Islands and Cliffe Point (approx 925ha moderate potential only)
- Shellfish deepwater aquaculture opportunity: limited survey conducted in area; not advisable
- Shellfish beach aquaculture opportunity: no survey data
- Shrimp harvest: 2527 ha (RI:3)
- Shipping lane for all Quatsino Sound traffic
- Commercial salmon fishery (long line)
- Commercial urchin diving
- Live rockfish fishery
- Offshore gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Shell Canada

Issues and Concerns

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations *(Based on "Acceptability")*

Tenured Uses			
X	Shellfish Beach Aquaculture	X	Log Booming Ground
X	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	X	Helicopter Log Drops
X	Marine Plant Aquaculture	X	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
X	Boat Launch	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – Conservation This unit should be managed to conserve significant bird habitat and significant high relief marine environment

Conditions for Tenure Application Acceptance

Tenure Approval and Management Guidelines

- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of red-listed pelagic Cormorant and the blue-listed Tufted Puffin.
- All applications in within the unit should be referred to the CWS

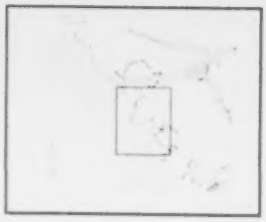
Required Action

- Establish Land Act Notation of Interest for that portion of the unit surrounding Gillam Islands to a depth of 50m (50m isobath depicted on CHS chart 3679) in favour of WLAP and CWS for marine conservation and protection purposes.

Unit 12 Southern Approaches

Description

This unit extends south from Quatsino Sound to the Brooks Peninsula, and comprises 19,348 ha and 96 km of shoreline. Similar to Unit 10, the shoreline of this high energy unit is composed primarily of rock cliffs and platforms overlain primarily by sand and gravel beaches. The incidence and extent of sand beaches is considerably higher than Unit 10. In general sediment is finer south of Quatsino Sound. Numerous nesting and breeding sites have been identified among the rocks and islets that border this unit along Brooks Peninsula.



Ecounit Profile

Ecounit : M,N	**PFMA:** 27-2, 4, 5
Substrate	hard
Exposure	high (fetch >500km)
Current	low (<3kn)
Roughness	low to moderate
Slope	flat (0-5%)
Depth	shallow to photic (0-50m)
Benthic Summer Temp	cool to warm (9°C to 9-15°C)

Areas of Ecological Significance

- Solander Island and northern coast of Brooks Peninsula
  - High value bird are
  - High biological productivity
  - Isolated and retained in 'natural' state with protected upland

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: Rowley Reefs are breeding sites for Fork-tailed and Leach's Storm-Petrel (second largest storm-petrel colony in BC), Glaucous-winged Gulls, provincially red-listed Pelagic Cormorants, Pigeon Guillemots, provincially blue-listed Tufted Puffins and Black Oystercatchers. The area provides overwintering habitat (fall through spring) for storm-petrels, gulls, cormorants, alcids and shore birds. The southern portion of the area falls within the Solander Island and Brooks Bay Important Bird Area. Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue-listed Surf Scoter), grebes, loons, mergansers and cormorants. Breeding sites have been identified for Glaucous-winged Gulls, Black Oystercatchers and Pigeon Guillemots
- Herring spawn segments 2.6km (RI:1)
- Kelp 298 ha (RI:3), 88 ha (RI:4)
- Clam (Bio RI:3; Comm RI:2)
- Adjacent protected areas: Kwakiutl/Lawn Point Provincial Park
- Salmon holding area *
- Seal/sea lion haulout out at Solander Island*
- Proposed rockfish conservation area: Brooks Bay

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves (1)
  - Telaise
- Traditional and Historic Uses
  - Salmon fishery – Side Bay
  - Nearshore and intertidal subsistence food gathering - Heater Pt to Sapir Pt

Current Uses & Activities

- Finfish aquaculture opportunity : assessed as not advisable
- Shellfish Deepwater aquaculture opportunity: no survey data
- Shellfish beach aquaculture opportunity: no survey data
- Recreational sites: Gooding Cove Day Use Area
- Identified campsites (9) Gooding Cove to Brooks Bay, Heater Point
- Boat launch (1) Side Bay
- Recreational fishing Gooding Cove, Kwakiutl Point
- Miscellaneous land use (1) Brooks Bay
- Foreshore cabin at Gooding Cove
- Proposed rockfish conservation area - Brooks Bay
- Commercial Prawn fishery
- Commercial urchin dive fishery
- Commercial crab fishery
- Offshore gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Petro-Canada

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing

Issues and Concerns

Coastal Management Goals

Use Recommendations (Based on "Acceptability")

Tenured Uses			
O	Shellfish Beach Aquaculture	X	Log Booming Ground
O	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	X	Helicopter Log Drops
X	Marine Plant Aquaculture	X	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
X	Boat Launch	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – Conservation Future development in this unit should be managed with consideration for the conservation of marine habitat values.

Conditions for Tenure Application Acceptance

- Applications for shellfish beach and deepwater aquaculture uses should be conditional on collection of additional biophysical information through Investigative Permit, and receipt of capability study results for the proposed area of use.

Tenure Approval and Management Guidelines

- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Surf Scoters, and red-listed Marbled Murrelet and Common Murre
- All applications within the unit should be referred to CWS.

Required Action

- Establish Land Act Notation of Interest on Rowley Reefs in favour of WLAP and CWS for marine conservation and protection purposes.

Unit 13 Klaskino Inlet

Description

This unit is consists of the relatively short Klaskino Inlet which comprises 932 ha and 37.4 km of shoreline. Although exposed to the Pacific, this is a lower energy system with a greater proportion of sand and gravel beach shoreline than witnessed in Unit 12: Southern Approaches. Klaskino Inlet includes the highest rated commercial clam harvest values in the Plan Area

Ecounit Profile

Ecounit : O	**PFMA**: 27-5
Substrate	hard
Exposure	high (fetch >500km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- None identified

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue-listed Surf Scoter), grebes, loons, mergansers and cormorants.
- 2 salmon streams: Chum, coho, pink
- eelgrass: 5 ha (RI:3)
- clam beds: 48 ha: littleneck, manila, unknown (Bio RI:1,2,3; Comm RI:4)
- herring spawn segments 6 km (RI:1), 0.7 km (RI:2), 0.6 km (RI:3)

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves (1)
  - Tsowenachs
- Traditional and Historic Uses
  - Nearshore and intertidal subsistence food gathering – Klaskino Anchorage, Klaskino Estuary

Current Uses & Activities

- Finfish aquaculture opportunity : not recommended due to siting criteria
- Shellfish Deepwater aquaculture opportunity: no survey data
- Shellfish beach aquaculture opportunity: no survey data
- prawn harvest 105 ha (RI:1)
- boat launch near head of inlet
- LWBC Planning/marketing/Development Project(1)
- Proposed rockfish conservation area - Brooks Bay
- Coast Guard mooring buoys (4)
- Gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Petro-Canada

Issues and Concerns

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations (Based on "Acceptability")

Tenured Uses			
O	Shellfish Beach Aquaculture	X	Log Booming Ground
O	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	✓	Helicopter Log Drops
X	Marine Plant Aquaculture	O	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
✓	Boat Launch	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – Recreation This unit should be managed to accommodate a range of recreational activities

Conditions for Tenure Application Acceptance

- Applications for shellfish beach and deepwater aquaculture uses should be conditional on collection of additional biophysical information through Investigative Permit, and receipt of capability study results for the proposed area of use.
- Applications for tenure that would result in disturbance of eel grass beds at the head of the inlet should not be accepted
- Existing moorage buoys should be maintained at current levels of use. Applications for new structures should not be accepted except to replace an existing operation undergoing decommissioning.

Tenure Approval and Management Guidelines

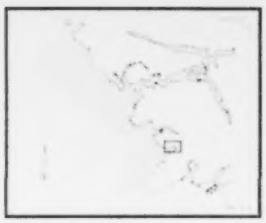
- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Surf Scoters, and red-listed Marbled Murrelet and Common Murre
- All applications within the unit should be referred to CWS.

Required Action

Unit 14 Klaskish Inlet

Description

This unit encompasses the 461 ha and 19.2km of shoreline of Klaskish Inlet. The rugged shoreline includes the highest proportion of rock cliffs of any unit. The head of the inlet abuts the Klaskish River Ecological Reserve.



Ecounit Profile

Ecounit : O	**PFMA**: 27-6
Substrate	hard
Exposure	high (fetch >500km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	photic (20-50m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

- Klaskish Inlet
  - isolated and retained in natural state with protected upland
  - contiguous with values identified in Brooks Peninsula provincial Park

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed area of use by migratory birds: Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue listed Surf Scoter), grebes, loons, mergansers and cormorants.
- Estuary: 18 ha
- Intertidal sand and gravel flats: 30 ha
- 1 salmon stream: Chinook, chum, coho, pink
- Eelgrass: 3 ha (RI:3)
- Clam bed: 10.8 ha. species unknown (Bio RI:3; Comm RI:2)
- Herring spawn segments: 12.3 km (RI:1),0.56 km (RI:3), 0.78 (RI:4)
- Sea otters *

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Salmon fishery – Klaskish Inlet

Current Uses & Activities

- Finfish aquaculture opportunity : not recommended due to siting considerations
- Shellfish Deepwater aquaculture opportunity: no survey data
- Shellfish beach aquaculture opportunity: no survey data
- Coast Guard mooring buoys (11): (3) Klaskish Anchorage, (8) Klaskish Basin
- Proposed rockfish conservation area - Brooks Bay
- Crab fishing
- Historical beach clam harvesting
- Gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Petro-Canada

Issues and Concerns

- High fecal coliform counts have resulted in prohibition on bivalve harvest. MWLAP has recommended that Klaskish Anchorage be designated as a "no marine discharge zone"

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations (Based on "Acceptability")

Tenured Uses			
X	Shellfish Beach Aquaculture	X	Log Booming Ground
X	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	X	Helicopter Log Drops
X	Marine Plant Aquaculture	O	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
X	Boat Launch	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis – Conservation This unit should be managed with the intention of limiting development of the East Creek Estuary, Klaskish Narrows and Basin

Conditions for Tenure Application Acceptance

- Existing moorage buoys should be maintained at current levels of use. Applications for new structures should not be accepted except to replace an existing operation undergoing decommissioning.

Tenure Approval and Management Guidelines

- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Surf Scoters, and red-listed Marbled Murrelet and Common Murre
- All applications within the unit should be referred to CWS.

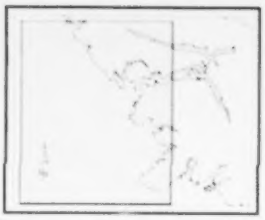
Required Action

- Place East Creek estuary, Klaskish Narrows and Klaskish Basin under a Land Act Notation of Interest in favour of WLAP for marine conservation and protection purposes
- Apply to Coast Guard to have Klaskish Basin designated as a "no marine discharge zone"

Unit 15 Quatsino Approaches – Brooks Bay

Description

This unit, at 74984 ha comprises more than half of the total Plan Area, is entirely marine in nature. This unit includes all the off shore waters in the Plan Area 50 to 200m in depth. Southern Brooks Bay is subject to sudden and severe wind gusts during southeast gales due to wind patterns over and around Brooks Peninsula. This area is of limited management significance for provincial agencies.



Ecounit Profile

Ecounit : M-V	**PFMA**: 27-4
Substrate	hard (isolated sand)
Exposure	high (fetch>500km)
Current	low (<3kn)
Roughness	low to moderate
Slope	flat (0-5%)
Depth	mid-depth (isolated deep) (50-200m, deep:200-1000m)
Benthic Summer Temp	cool (<9°C)

Areas of Ecological Significance

- Offshore area west of Brooks Peninsula
  - Area of natural upwelling
  - High biological productivity
  - High utilisation by migrating marine mammals

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds. The northwestern portion of this unit provide summer habitat for shearwaters, albatross and alcids (including provincially blue-listed Ancient Murrelets, Cassin's Auklets and Tufted Puffins) The southern portion of the unit includes much of the Solander Island and Brooks Bay Identified Bird Area and provide spring and summer habitat for gulls, shorebirds, alcids, storm-petrels, cormorants, albatross and shearwaters.
- Blue listed Percursaria Dawsonii marine algae located in the vicinity of Cape Cook, Brooks Peninsula

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

Current Uses & Activities

- Finfish aquaculture opportunity: no survey data
- Shellfish Deepwater aquaculture opportunity: no survey data
- Shellfish beach aquaculture opportunity: no opportunity
- shrimp harvest: 17300 ha (RI:3)
- Commercial halibut fishery
- Proposed rockfish conservation area - Brooks Bay
- Science measurement/research (1)
- Offshore gravel deposits assessed as having commercial potential
- Offshore oil and gas tenures held by Petro-Canada, Shell Canada, Exxonmobil and Chevron

Issues and Concerns

** denotes local knowledge*

The Plan recommendations on acceptability of a tenure application do not alter or remove provincial agency obligations for First Nations consultation, as established in Delgamuukw v R, et al if specific development applications are accepted for processing.

Coastal Management Goals

Use Recommendations (Based on "Acceptability")

Tenured Uses			
X	Shellfish Beach Aquaculture	X	Log Booming Ground
X	Shellfish Deepwater Aquaculture	X	Log Handling Facilities
X	Finfish Aquaculture	X	Helicopter Log Drops
X	Marine Plant Aquaculture	X	Private Residential Moorage
X	Marine Residential	X	Light Docks, Wharves and Facilities
X	Floating Lodges and Base Camps	X	Heavy Docks, Wharves and Facilities
X	Boat Launches	X	Marine Telecommunications and Utilities
✓	Commercial Recreation Guiding	✓	Conservation
Non-Tenured Activities			
P	First Nations Use	P	Public Recreation
P	Commercial Fisheries	P	Marine Transportation

Code	
✓	Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.
O	Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.
X	Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.
P	The non-tenured activity is present and ongoing in the Planning Unit
A	The non-tenured activity is absent from the Planning Unit

Management Emphasis - General Marine This unit should be managed with the intent of supporting the existing suite of uses and activities.

Conditions for Tenure Application Acceptance

Tenure Approval and Management Guidelines

- Commercial recreation guiding use of this unit should be conditional on operating practices that follow established guidelines and / or performance based standards for minimizing impacts on bird colonies and migratory bird habitat, particularly that of the blue-listed Surf Scoters, and red-listed Marbled Murrelet and Common Murre.
- All applications within 3 km of Brooks Peninsula should be referred to CWS.

Required Action

Brooks Peninsula Provincial Park

Description

Established in 1986, this Class A park encompasses 45,800 ha of upland and 5,832 ha of marine waters including the foreshore of the Solander Island Ecological Reserve. Jutting 14km into the Pacific, the peninsula is marked by nearly continuous cliffs and rocky reefs. The mountainous landscape of the area obstructs coastal weather formations driving winds to increased velocity as they travel around and over the land. Winds measured at Solander Island may be 15knots higher than further offshore or away from the point, while gusty southeast winds may be hazardous to smaller boats in Brooks Bay.

Ecounit Profile

Ecounit :	**PFMA** 27-6, 26-11
Substrate	hard
Exposure	high (fetch>500km)
Current	
Roughness	
Slope	
Depth	
Benthic Summer Temp	

Areas of Ecological Significance

- Entire area
  - Pristine upland habitat provides nesting habitat for marbled murrelets and other coastal birds
  - Offshore islands identified as nesting sites for gulls, oystercatchers and pigeon guillemots
  - High marine biological productivity

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- The park overlaps the Solander Island and Brooks Bay Important Bird Area. Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue-listed Surf Scoter), grebes, loons, mergansers and cormorants (including provincially blue-listed pelagic, double crested and Brandt's species). Breeding sites have been identified for Glaucous-winged Gulls, Black Oystercatchers and Pigeon Guillemots
- Area within 500m of the north shore of Brooks Peninsula is considered important feeding area for Marbled Murrelets
- Kelp – 3 moderately to highly important beds
- Eelgrass 4 beds
- Sea Otters – high importance year round

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian reserves (1)
  - Klaskish Anchorage
- Traditional and Historic Uses
  - Nearshore and intertidal subsistence food gathering – vicinity of Klaskish Anchorage
  - Battle Bay – area of cultural and historic significance

Current Uses & Activities

- Majority of area included in proposed Brooks Bay rockfish conservation area
- Sea kayak area – northwest shore
- Crab fishery – moderate commercial importance Fisheries Stat area 127)

Issues and Concerns

Coastal Management Goals.

Required Action

Cape Scott Provincial Park

Description

This park, established in 1973, encompasses 17,348 ha of upland and 4,872 ha of marine waters at the northwest tip of Vancouver Island. Exposed to the open ocean, the 64 km of coastline demonstrates a range of features from long sandy beaches to rocky reefs. Sea Otter Cove, near the southwest limit of the park is the most northerly all weather anchorage on the west coast of Vancouver Island.

Ecounit Profile

Ecounit :	PFMA 12-14, 27-1,2
Substrate	hard
Exposure	high
Current	low to high(<3kn<)
Roughness	low
Slope	flat
Depth	shallow to photic (0-50m)
Benthic Summer Temp	warm

Areas of Ecological Significance

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds from fall through spring. High value habitat for dabbling ducks, cormorants (possibly including the provincially red-listed pelagic, double crested and brandt's cormorants), alcids (possibly including the provincially red-listed common murres and blue-listed tufted puffins) and swans (possibly including the provincially blue-listed trumpeter swan)
- 41 Eagle nests identified in park
- medium to high importance for resident and migrant grey whales, killer whales, pacific white-sided dolphins
- low importance to seals, sea lions – except northern sea lions – year round medium importance near Cape Scott lighthouse
- low but increasing importance for sea otters
- Clam beach – high biological importance in Sea Otter Cove, also Hansen Lagoon, San Josef River estuary
- Geoducks – Sea Otter Cove, Hansen Lagoon, San Josef River estuary
- Kelp - 9 beds – high biological importance

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Numerous heritage sites throughout

Current Uses & Activities

- recreation facilities and services
- moorage buoys Sea Otter Cove
- historic settlement sites at Hansen lagoon, Cape Scott
- numerous shipwrecks on foreshore and offshore
- rockfish conservation area Vancouver Island north of Lowrie Bay included in Scott island interim rockfish protection area/proposed conservation area

Issues and Concerns

Coastal Management Goals

Required Action

Klaskish River Ecological Reserve

Description

This ecological reserve, established in 1990 to protect the upper Klaskish basin and Klaskish River estuary encompasses 92 ha of upland and 40 ha of marine and foreshore waters.

Ecounit Profile

Ecounit : **PFMA 27-6**

Substrate	This area varies sufficiently from the overarching ecounit that categorisation under these parameters would be misleading
Exposure	
Current	
Roughness	
Slope	
Depth	
Benthic Summer Temp	

Areas of Ecological Significance

- entire area
  - important salmon rearing habitat in estuary and lower stream reach

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- The park falls within the Solander Island and Brooks Bay Important Bird Area. Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue-listed Surf Scoter), grebes, loons, mergansers and cormorants (including provincially blue-listed pelagic, double crested and Brandt's species).
- Marbled Murrelets – high levels of activity recorded in 1991 survey of Klaskish.
- salmon stream (1) coho, pink, chum, Chinook – lower river and estuary provide important rearing habitat for juvenile salmonids
- herring spawn – importance very low
- clam beds Klaksish Basin – moderate importance. Also uncommon Olympia oyster present
- eelgrass beds at head of estuary
- Grey whales medium importance for migrants November through April
- Sea Otters medium importance year round

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

Current Uses & Activities

- Herring roe fishery – area of moderate importance in adjacent Klaskish Inlet
- Goeduck fishery – moderate to very low importance for commercial fishery

Issues and Concerns

Coastal Management Goals.

Required Action

Kwakiutl Lawn Point Provincial Park

Description

Established in 1996 this class A park encompasses 512 ha of upland and 72 ha of marine waters. The shoreline is rock or sand and gravel beaches overlaying rock substrate. The shoreline between Kwakiutl and Lawn Pts are marked by submerged and drying rocks and small islands.

Ecounit Profile

Ecounit :	**PFMA** 27-2, 4
Substrate	hard
Exposure	high (fetch>500km)
Current	low (<3kn)
Roughness	low
Slope	flat (0-5%)
Depth	shallow (0-20m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- The park marks the northern extent of the Solander Island and Brooks Bay Important Bird Area. Year-round habitat is provided for gulls, shore birds, alcids (including the provincially red-listed Marbled Murrelet and Common Murre) diving ducks (including the provincially blue-listed Surf Scoter), grebes, loons, mergansers and cormorants (including provincially blue-listed pelagic, double crested and Brandt's species).
- Black Oystercatcher nesting sites have been identified in the nearby Rugged Islands
- Bald Eagle – 4 nest sites identified in park
- Grey whales – moderate importance to migrant whales November through April
- Sea otters – year round moderate importance

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Salmon fishery nearby in Side Bay

Current Uses & Activities

- Sea kayaking – frequent destination for kayakers wishing to explore brooks Peninsula
- Camping – 3 sites within park, additional nearby
- Fisheries – moderately important hook and line fishery
- Proposed Rockfish Conservation Area – Brooks Bay – encompasses south shore of park from Lawn Pt to south eastern park boundary

Issues and Concerns

Coastal Management Goals

Required Action

** denotes local knowledge*

Marble River Provincial Park

Description

Incorporating 439 ha of marine waters, 1,073 ha of adjacent upland and approximately 20 km of shoreline, this Class A provincial park was established July 12, 1995. This park includes the Marble River canyon, one of the most important salmon runs in the Plan Area, and the largest channel shoretype segment in the Plan Area. Due to the volume of water flowing though Quatsino Narrows, currents may run as high as 9 knots. This stands as a marked contrast to Varney Bay's extensive low energy estuary.

Ecounit Profile

Ecounit : M-V	**PFMA** 27-9
Substrate	hard (Narrows) to mud (Varney Bay)
Exposure	low (fetch<50km)
Current	low (<3kn) to high (>3kn)
Roughness	low
Slope	flat (0-5%) to sloping (5-20%)
Depth	photic (20-50m) to mid-depth (50-200m)
Benthic Summer Temp	cold (<9°C)warm (9-15°C)

Areas of Ecological Significance

- Quatsino Narrows
  - unique costal feature
  - area of high biodiversity and productivity
  - frequented by marine mammals
  - lingcod spawning and rearing area
  - abalone and urchin area
  - protected upland preserves 'natural state'
- Varney Bay
  - area of high natural productivity
  - significant estuary, entrance to one of most productive systems in area
  - historic seal haulout and calving area
  - protected upland preserves 'natural state'

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds. Varney Bay and Quatsino Narrows provide winter through summer habitat for dabbling and diving ducks (including the provincially blue listed Surf Scoter),gulls, grebes (including the provincially red-listed Western Grebe), loons, alcids (including the red-listed Marbled Murrelet),eagles, herons (including the provincially blue-listed great Blue Heron), swans (including the provincially blue-listed Trumpeter Swan) and geese (including the provincially listed Canada Goose)
- Estuary
- Sea Urchin
- Salmon stream – Chinook
- Steelhead run

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves (3)
  - Kultah
  - Maquazneecht Island
  - Quattishe (adjacent)
- Traditional and Historic Uses
  - nearshore and intertidal subsistence food gathering - Quatsino Narrows
  - Seabird egg gathering – Varney Bay
  - Salmon fishery – Varney Bay –Rupert Inlet

Current Uses & Activities

- Existing fisheries closures
  - Chinook: portion of Varney bay ,closed to harvest, remainder non-retention Aug1-Sep30-
  - All finfish – portion of Varney Bay closed to recreational fishing Jun 25-Dec 31
- Sea kayaking – Quatsino Narrows
- White water Kayaking – Marble River
- Crab fishery – Varney Bay
- Sea urchin harvest – Quatsino Narrows

Issues and Concerns

- Quatsino Narrows is a primary navigation route

Coastal Management Goals

Required Action

Quatsino Provincial Park

Description

Encompassing the eastern headland overlooking Koprino Harbour, this provincial park includes 622ha of upland and 32 ha of estuarine habitat. The shoreline is primarily sand and gravel although the underlying material varies from sediment to rock platforms to cliffs on the more exposed southern shore.

Ecounit Profile

Ecounit : M-V	**PFMA** 27-7
Substrate	mud
Exposure	low (fetch<50km)
Current	low (<3kn)
Roughness	low
Slope	sloping
Depth	shallow (0-20m) to mid-depth (50-200m)
Benthic Summer Temp	cold (<9°C)

Areas of Ecological Significance

- Koprino Harbour
  - area of high biodiversity and productivity

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds through winter and spring. Very high value for dabbling and diving ducks, high value habitat for shore birds and moderate importance for geese (including the provincially blue-listed Canada Goose)
- Kelp bed
- Eelgrass bed

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Indian Reserves (2
  - Clatux
  - Koprino
- Traditional and Historic Uses
  - Nearshore and intertidal subsistence food gathering - Koprino Harbour
  - Upland bird hunting - throughout

Current Uses & Activities

- sea kayaking destination

Issues and Concerns

Coastal Management Goals

Required Action

Raft Cove Provincial Park

Description

Established in 1990, this Class A provincial park comprises 405 ha of upland and 265 ha of exposed west coast marine habitat at the outlet of the Mackjack River. Gravel Beaches at the northern and southern extremities of the park give way to sand beaches in the centre; a sand bar across the mouth of the Mackjack forces the river into a sharp hairpin.

Ecounit Profile

Ecounit : M-V	**PFMA** 27-1
Substrate	hard
Exposure	high (fetch>500km)
Current	low (<3kn)
Roughness	low to moderate
Slope	flat (0-5%)
Depth	shallow (0-20m)
Benthic Summer Temp	warm (9-15°C)

Areas of Ecological Significance

Unit Attributes:

Values listed below may include areas of localized ecological significance. Refer to Section 2.5

- CWS confirmed areas of use by migratory birds from fall through spring. High value habitat for dabbling ducks, cormorants (possibly including the provincially red-listed pelagic, double crested and brandt's cormorants), alcids (possibly including the provincially red-listed common murres and blue-listed tufted puffins) and swans (possibly including the provincially blue-listed trumpeter swan)
- Bald eagle (3 nests in park)
- Sea otters - moderately important habitat year round
- Salmon stream – Mackjack
- Kelp beds – highly important within park and at boundaries

First Nations:

Material is subject to constant review and update. Contact the Quatsino First Nation for more information

- Traditional and Historic Uses
  - Salmon fishery on Mackjack River

Current Uses & Activities

- fair weather anchorage
- primitive camping, hiking
- rockfish protection area – Topknot (commercial groundfish prohibition) includes park
- limited crab trap commercial fishery

Issues and Concerns

Coastal Management Goals

Required Action

4.0 Plan Assessment

4.1 Environmental Implications of Plan Recommendations

It is difficult to quantify the degree of environmental risk associated with the Quatsino Sound Coastal Plan, primarily because it does not in itself result in the approval of tenured uses. The number and type of actual new tenures that may be derived from the Plan is also highly speculative, although the Plan does recommend restricting certain types of uses. There is also considerable debate and lack of clear scientific knowledge of the effect of various foreshore uses on marine ecosystems. As a result, the environmental impact assessment is largely qualitative.

Methodology

The environmental review attempts to evaluate the sensitivity of key ecological attributes found in the Plan Area to potential impacts from tenured uses recommended in the Plan, and to determine the overall environmental risks and benefits of the Plan. The review uses a combined quantitative and qualitative approach to evaluate the overall impacts of Plan recommendations on the Plan Area as well as impacts to each of the 15 planning units. As there is no way to estimate the actual range and number of new tenured uses that might occur as a result of the Plan, the environmental review provides only a rough approximation of potential environmental risks and benefits.

For the individual units, a more quantitative approach was used to identify the relative risks and benefits of the Plan. This required identifying six Valued Environmental Components (VECs): kelp beds, intertidal clam beaches, salmon streams, eelgrass beds, seabird and pinniped habitat (seal, sea lion haul out areas, sea otter raft areas). While data availability was one of the considerations in selecting the VECs, the environmental review is nevertheless limited by the accuracy and comprehensiveness of currently available biological information in the Plan Area. The level of existing development and potential for additional tenures were rated for each unit. For each combination of VEC and tenure type, a sensitivity rating was assigned. The ratings for VEC value, tenure type level, and VEC-tenure sensitivity were then combined to obtain a "relative risk" value. By aggregating the results of this analysis, it was possible to make overall assessments of the potential risks to VECs in each unit and in the Plan Area as a whole. Adjacency issues, management provisions and conservation areas recommended in the Plan were also assessed qualitatively to augment the unit assessment.

A more detailed outline of this methodology and its application to the Plan Area can be found in Appendix VI.

General Plan Environmental Implications

The Plan in general does not recommend elimination of existing tenures, although for some uses (primarily finfish aquaculture and log handling) the Plan recommends that no additional tenures be contemplated. It can therefore be assumed that the existing levels of environmental impact as well as potential risk to the marine environment are maintained.

In terms of assessing new environmental risk attributable to the Plan, the categorization of planning units by management emphasis is also a factor. Management Emphasis is essentially a product of the plan process rather than a type of zoning; conservation emphasis indicates that the plan recommends that the unit be managed primarily for conservation values while a community emphasis unit is more likely to have a broader range of tenure types present due to the relative concentration of human activity. Table 16 provides area data both inclusive and exclusive of unit 15: Quatsino Approaches – Brooks Bay as it lacks an intertidal component. Conservation emphasis units, which account for approximately 15% of the Plan Area (33% of nearshore and intertidal area), tend to afford greater benefit to environmental attributes as

they are predominated by or adjacent to significant marine and foreshore ecological values while tenure opportunities are relatively limited or guided by management recommendations. Units assigned a Recreation Emphasis, accounting for nearly 15% of the Plan Area (one-third of nearshore and Intertidal area), are often adjacent to areas favoured for commercial and personal recreation and tend to support conservation of important biological attributes which contribute to the overall quality of the recreation experience. The General Marine emphasis units, occupying the largest proportion of the Plan Area at 67%, tend to have a greater variety of potential uses, and therefore vary in potential environmental impact. Note that this value changes considerably to slightly less that 28% the Plan Area when limited to nearshore and intertidal areas. General Marine Emphasis units include areas of lower biological diversity or may reflect planning units with a range of values from biological to community, none of which predominates the entire unit. General Marine units are typically available to a wide range of tenure programs while specific management recommendations serve to mitigate risks to more sensitive portions of the unit. The Community emphasis, accounting for less than 3% of the Plan Area (6% of nearshore and Intertidal area), promotes multiple uses and activities associated with adjacent upland settlement areas, and generally affords the least benefit to environmental values.

Table 18 summarizes the degree to which key identified biological attributes are represented by planning units in the four management emphasis categories. Conservation Emphasis planning units are clustered on the exposed western coast of Vancouver Island and provide good representation for bird and marine mammal values and kelp habitat. At the same time, the majority of wild clam beds and estuarine and eel grass based habitat are concentrated in the more sheltered inlets of the Plan Area. While these values may be perceived to be at greater environmental risk due to their inclusion in General Marine Emphasis Units, efforts have been made to address these concerns at a more detailed scale through management recommendations.

The Quatsino Sound Plan recommends notations of interest (NOIs) for marine conservation and protection for specific areas within two Conservation Emphasis planning units. These areas are to be reserved against tenure until further review as part of a federal-provincial marine conservation assessment can be conducted. Depending on the outcome of this assessment, the Plan may lead to a higher level of marine protection for these high value areas than is currently afforded by the Plan.

Finally, the Plan identifies "conservation" uses as acceptable uses in all of the 15 planning units. This means that there may be further opportunities to afford protection or conservation of discrete areas of high biological values through the establishment of Land Act reserves or notations of interest. These opportunities may therefore result in additional protection of values that cumulatively should help offset some of the overall environmental risks associated with new tenures in the Quatsino Sound Plan Area.

Table 16. Distribution of Plan Area by Management Emphasis Category

Management Emphasis Category	Shoreline Length (km)	Shoreline Length (%)	Planning Unit Area (km2)	Planning Unit Area (%)	Planning Unit Area (km2) Unit 15 excluded	Planning Unit Area (%) Unit 15 excluded
General Marine	302.68	45.45	918.18	67.36	168.34	27.45
Community	125.92	18.91	37.19	2.73	37.19	6.07
Recreation	133.48	20.04	202.80	14.88	202.80	33.07
Conservation	103.86	15.60	204.83	15.03	204.83	33.41

Unit	Management Emphasis	Existing Risk			Plan Risk			Residual Risk			Residual Risk Category
		Habitat	Species	Total	Habitat	Species	Total	Habitat	Species	Total	
1	General Marine	87	54	141	159	96	255	72	42	114	HIGH
2	General Marine	16	27	43	31	48	79	15	21	36	LOW
3	Community	44	30	74	69	48	117	25	18	43	LOW
4	General Marine	72	27	99	113	45	158	41	18	59	MODERATE
5	Community	82	72	154	90	78	168	8	6	14	LOW
6	General Marine	23	30	53	70	96	166	47	66	113	HIGH
7	General Marine	65	33	98	90	48	138	25	15	40	LOW
8	General Marine	72	66	138	132	108	240	60	42	102	HIGH
9	Community	138	84	222	170	108	278	32	24	56	MODERATE
10	Conservation	9	18	27	15	24	39	6	6	12	LOW
11	Conservation	3	18	21	3	18	21	0	0	0	LOW
12	Recreation	1	6	7	22	30	52	21	24	45	LOW
13	Recreation	12	9	21	25	21	46	13	12	25	LOW
14	Conservation	72	6	10	13	24	37	9	18	27	LOW
15	General Marine	82	0	0	0	18	18	0	18	18	LOW

Table 18. Residual Risk by Risk Category and Management Emphasis

Residual Risk by Management Emphasis Category	Shoreline (km)	Shoreline (% of Plan Area)	Marine Area (km2)	Marine Area (% of Plan Area)	Marine Area (%) Unit 15 excluded
General Marine	302.68	45.45	918.18	67.36	27.45
High	209.97	31.53	115.61	8.48	18.85
Moderate	31.81	4.78	17.52	1.29	2.86
Low	60.90	9.14	785.05	57.60	5.74
Community	125.92	18.91	37.19	2.73	6.07
High	N/A	N/A	N/A	N/A	N/A
Moderate	73.38	11.02	17.77	1.30	2.90
Low	52.54	7.89	19.42	1.42	3.17
Recreation	133.48	20.04	202.80	14.88	33.07
High	N/A	N/A	N/A	N/A	
Moderate	N/A	N/A	N/A	N/A	
Low	133.48	20.04	202.80	14.88	33.07
Conservation	103.86	15.60	204.83	15.03	33.41
High	N/A	N/A	N/A	N/A	
Moderate	N/A	N/A	N/A	N/A	
Low	103.86	15.60	204.83	15.03	33.41

Table 19. Residual Risk by Risk Category

Risk Category	Shoreline Length (km)	Shoreline Length (%)	Planning Unit Area (km2)	Planning Unit Area (%)	Planning Unit Area (km2) Unit 15 excluded	Planning Unit Area (%) Unit 15 excluded
High	209.97	31.53	115.61	8.48	115.61	18.85
Moderate	105.19	15.80	35.29	2.59	35.29	5.76
Low	350.78	52.67	1212.10	88.93	462.26	75.39

Individual Unit Environmental Assessment

The Environmental Impact Assessment is based upon an assumption that both biological attributes and potential tenures are distributed evenly across the planning unit. Attempts to be more precise would likely be counter-productive given uncertainty about the quantity and distribution of future tenure as well as data quality issues. Comparison of Planning Unit results identified in Appendix VI against unit maps provides a straightforward approach to assessing gaps in tenure acceptance, approval and management recommendations. For example, the assessment for Unit 1: Upper Holberg indicates existing, plan related and residual impacts are all rated as High. This is a consequence of high VEC ratings for clams, eelgrass, salmon, seabirds and pinnipeds and a broad range of potential tenure types supported by plan recommendations. The unit map indicates that resources are generally distributed across the unit, with a number of points of concentration. Two of these areas of concentration, Goodspeed Estuary and the Straggling Islands, have been identified as Areas of ecological significance. Proponents are advised that applications in these areas will face close scrutiny during the referral process, particularly by DFO. Tenure approval guidelines recommends against modifications to Goodspeed Estuary or stream deltas within the planning unit. Commercial recreation, generally seen as a low impact use, may have potential to

significantly impact habitat and species unless appropriate measures are taken to limit or avoid conflict. To this end, the plan recommends that commercial recreation use in the area should be conditional upon following guidelines and/or performance based standards related to bird habitat. In conclusion, despite the high residual risk rating, it can be seen that Plan recommendations can serve to mitigate a substantial portion of potential impacts.

The Plan identifies "conservation" uses as acceptable uses in all of the 15 planning units. This means that there may be further opportunities to afford protection or conservation of discrete areas of high biological and recreational values through the establishment of Land Act reserves or notations of interest. These opportunities may therefore result in additional protection of values that cumulatively should help offset some of the overall environmental risks associated with new tenures in the Quatsino Sound Plan Area.

4.2 Economic Implications of Plan Recommendations

Methodology

The North Island Straits Coastal Plan, completed in late 2002, included an attempt to conduct an abridged multiple accounts analysis (MAA) as a means to assess economic implications of that Plan's recommendations. This method is used by provincial planning agencies and Crown corporations to systematically document and evaluate impacts from different perspectives or "accounts."[••] The multiple accounts evaluation used in provincial Land and Resource Management Plans proved very difficult to employ because Plan recommendations cannot guarantee that an application will be made or that applications will be approved and result in new tenured developments. The assessment of the economic implications of the Quatsino Sound Coastal Plan is limited in similar fashion to the North Island Straits Plan, and will therefore rely largely on qualitative assessment.

The North Island Straits Coastal Plan presented a list of coastal uses and their anticipated economic effect (Table 20). While this data cannot readily be used to quantify the economic effects of the Quatsino Sound Coastal Plan, it does illustrate the economic effect of the various uses contemplated by the Plan.

Table 20. Economic Impact Coefficients for Selected Coastal Uses

Foreshore/ Nearshore Use	Capital Investment ($'000/site)	Annual Direct Jobs (PYs/site)	Annual Total Jobs (PYs/site)	Annual Direct BC Revenue* ($/site)
Finfish Aquaculture	900	4.0	7.60	43,000
Shellfish Beach Aquaculture	150	0.9	1.60	9,700
Shellfish Deepwater Aquaculture	110	2.0	3.30	21,500
Marine Plant Aquaculture	6	2.0	3.30	21,500
Floating Lodges	1150	11.0	13.30	43,900
Commercial Rec. Base Camps	490	4.9	5.80	19,600
Heli-Log Drop Sites **	460	4.0	8.30	60,000
Log Sorts	850	1.5	3.10	22,500
Log Storage Pens	225	1.0	2.10	15,000
Public Docks and Wharves	56	1.8	3.6	26,000

* See *Social and Economic Impact Assessment for Land and Resource Management Planning in British Columbia: Interim Guidelines*, Integrated Resource Planning Committee, August, 1993. The guidelines for land and resource management planning are currently being reviewed and updated.

Commercial Docks and Wharves	740	15.7	32.5	236,000
Tidewater Industrial	1300	47.8	58.3	121,000

Sources: North Island Straits Coastal Plan, MSRM, December 2002 * Includes taxes on direct, indirect and induced incomes as well as direct LWBC lease / rental fees. ** Capital investment estimate for heli-log drop sites assumes 6 sites each operated for 2 months per year.

General Assessment

The Quatsino Sound Coastal Plan designates uses as acceptable or acceptable at current levels if they are already tenured in a given planning unit. The Plan also recognizes and supports existing activities that are neither tenured nor managed by the Province (e.g. recreation activities) where they are known to occur. Therefore, the Plan affirms all existing uses and activities within the Plan Area, and along with them any current and projected economic benefits. However, the economic benefits of these uses, such as log handling and private moorage, are not attributed to the Plan's accounts.

In certain planning units, existing uses are designated as acceptable only at current levels. Applications in process prior to approval of this Plan are intended to proceed through the normal interagency referral process, which would consider existing siting policies and the guidelines in the Quatsino Sound Coastal Plan.

Alternative locations may have cost and profitability implications for planned and proposed uses which can have indirect employment, provincial revenue and community impacts. These impacts are not quantified due to their uncertain nature and a lack of readily available data.

The Quatsino Sound Coastal Plan will primarily affect future uses and related economic development. Quantitative estimates of the incremental impacts of the Plan for key commercial uses were not identified, as mentioned above, due to the speculative nature of determining future sites.

The Plan may impose costs on certain aquaculture, commercial and industrial activities, particularly where uses are conditionally acceptable. However, since the Plan's main impact is to establish general direction for dealing with applications, rather than changing specific siting criteria, it is unlikely that these costs would be greater than under the current management regime.

In addition to the implications for specific coastal uses, the Quatsino Sound Coastal Plan has some indirect socio-economic benefits that result from coastal planning that cannot be quantified. These include greater investor certainty and reduced capital and operating costs resulting from affirmation of existing uses and clearer management direction for new development, which should clarify the terms and conditions governing the siting approval process administered by LWBC. Reduction in resource conflicts is also an anticipated benefit that will result in sustainable economic development.

The proportion of new investment and employment opportunities that will accrue to communities and residents of the Plan Area depends on the local sourcing of labour and materials, supplies and equipment. Local sourcing depends on factors such as the type of use, the proximity of the development to communities in the Plan Area, local production capacity and the hiring policies of tenure holders.

Economic benefits of the Plan are expected to accrue to both the Plan Area and to communities in the surrounding area.

The above discussion applies to both First Nation and non-First Nation communities. Unemployment rates among First Nations are typically much higher than for non-aboriginal population, and First Nations communities are much more reliant upon a mixed-subsistence economy which relies on marine food sources, particularly fisheries, to supplement household incomes or compensate for low incomes. Aboriginal harvests

of marine resources are likely to remain important parts of the Aboriginal income stream in the Plan Area. The Plan encourages increased involvement for the Quatsino First Nation in economic activities, while respecting traditional resource based uses and activities. If properly implemented, the Plan should have positive economic implications for Quatsino First Nation.

5.0 Plan Follow Up

5.1 Summary of Plan Recommendations

Table 21. Summary of Acceptable Uses by Planning Unit

	1. Upper Holberg	2. Lower Holberg	3. Coal Harbour	4. Rupert Inlet	5. Quatsino	6. Buchholz-Neroutsos	7. Port Alice	8. Koprino	9. Winter Harbour	10 San Josef-Cape Parkins	11. Quatsino Entrance	12. Southern Approaches	13. Klaskino Inlet	14. Klaskish Inlet	15. Brooks Bay-Quatsino Approaches
Shellfish Beach Aquaculture	✓	X	O	✓	O	✓	O	✓	✓	X	X	O	O	X	X
Shellfish Deepwater Aquaculture	✓	✓	O	✓	O	✓	O	✓	✓	X	X	O	O	X	X
Finfish Aquaculture	X	✓	O	X	X	✓	O	O	✓	X	X	X	X	X	X
Marine Plant Aquaculture	O	O	O	O	O	O	O	O	O	X	X	X	X	X	X
Marine Residential	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Floating Lodges and Base Camps	O	O	X	✓	X	X	X	O	O	X	X	X	X	X	X
Boat Launches	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	✓	X	X
Commercial Recreation Guiding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Log Booming Ground	✓	✓	O	✓	O	O	O	O	O	X	X	X	X	X	X
Log Handling Facilities	✓	O	O	✓	O	O	O	O	O	X	X	X	X	X	X
Helicopter Log Drops	✓	✓	X	✓	✓	✓	✓	✓	O	X	X	X	✓	X	X
Private Residential Moorage	✓	X	✓	✓	✓	✓	✓	✓	✓	X	X	X	O	O	X
Light Docks and Wharves	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	X	X
Heavy Docks and Wharves	✓	✓	✓	O	O	✓	✓	✓	✓	X	X	X	X	X	X
Marine Telecommunications and Utilities	✓	✓	✓	X	✓	✓	✓	✓	✓	O	X	X	X	X	X
Conservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ Acceptable. The use is considered acceptable and appropriate. Applications for this use should be accepted for processing and evaluation. Acceptance of an application does not guarantee that a tenure will be approved.

O Conditionally Acceptable. The use is considered conditionally acceptable. New applications for this use should be accepted for processing and evaluation only if they meet the terms of relevant Management Provisions in the Plan.

X Not Acceptable. The use is considered inappropriate. Applications for this use should not be accepted for processing and evaluation.

5.2 Information Limitations

The individual unit maps and unit direction will be used by LWBC, potential applicants and the public to determine the degree of acceptability of a Crown foreshore or nearshore application. However, Plan users

should be aware of the limitations inherent in the planning unit descriptions and maps. While the maps and text for each unit outline the complexity of values and uses within each unit, they can only represent information available at the time of Plan preparation. As a result they cannot and should not replace any LWBC requirements for more site specific information to accompany an application. Since the Planning Unit maps are available on the MSRM web site and are linked to all supporting maps and information sources within MSRM, they will be regularly updated and will therefore be of continuing value to LWBC and other users in such activities as plan monitoring, plan amendment, site planning and marketing.

The information contained in this Plan will be used by Fisheries and Oceans Canada as background information for decision-makers in a variety of programs. Habitat and Coast Guard staff will use this and other information which may be available at a relevant site scale to inform the tenure referral process; to provide an overview of possible issues relating to impacts of proposed activities on fish and fish habitat, possible Navigable Waters issues; and, to gain a better understanding of the overall social, economic, and environmental values in the area. Due to limitations in the information available for development of the plan and its recommendations, decisions may not adhere to the recommendations contained in this plan. As well, site specific concerns may apply to individual sites, and applicants should be aware that each application submitted undergoes a full and formal review which may require the applicant to provide additional information specific to their application.

5.3 Summary of Recommendations for Notations and Reserves

Some planning units recommend a Land Act notation of interest be placed or maintained (if already present) so that applications for uses recommended in the planning unit are not processed unless they can accommodate the interests of the agency with the specific interest in maintaining conservation or recreation values of the area. In addition, one planning unit includes a recommendation that a reserve be placed under the Land Act, to preclude the issuance of tenures.

For those areas recommended as boat havens, boundaries should be established using the proposals submitted to government by the BC Council of Yacht Clubs.

In order for LWBC to place notations or reserves over these areas, official letters of request will be required from WLAP and (in some cases) from Canadian Wildlife Service.

Table 22. Summary of Areas Recommended for Land Act Notation of Interest (NOI) or Reserves

Planning Unit No. & Name	Specific Area	Purpose & Sponsoring Agency
Unit 4: Rupert Inlet	Rupert Inlet	Establish Land Act NOI - Towboat Reserve - in favour of MSRM
Unit 5: Quatsino	Pamphlet Cove	Maintenance of Land Act Reserve- Boat Haven –WLAP
Unit 6: Buchholz – Neroutsos	Southwest of Drake Island	Establish Land Act NOI - Towboat Reserve - in favour of MSRM
Unit 7: Port Alice	East of Ketchen Island	Establish Land Act NOI - Towboat Reserve - in favour of MSRM
Unit 8: Koprino	West of Ilstad islands West of Mahatta River	Establish 2 Land Act NOIs - Towboat Reserve - in favour of MSRM
Unit 9: Winter Harbour	Browning Inlet salt marsh	Establish Land Act NOI for marine conservation and protection purposes in favour of WLAP and CWS
Unit 10: San Josef-Cape Parkins	Grant Bay	Establish Land Act NOI for public recreation in favour of WLAP

Planning Unit No. & Name	Specific Area	Purpose & Sponsoring Agency
Unit 11: Quatsino Entrance	Gillam Islands	Establish Land Act NOI for marine conservation and protection purposes in favour of WLAP and CWS
Unit 12: Southern Approaches	Rowley Reefs	Establish Land Act NOI for marine conservation and protection purposes in favour of WLAP and CWS
Unit 14: Klaskish Inlet	East Creek estuary, Klaskish Narrows and Klaskish Basin	Establish Land Act NOI for marine conservation and protection purposes in favour of WLAP

5.4 Commercial Recreation Guiding Practices for Bird Colonies and Migratory Bird Habitat

Section 3.7 of the Plan identifies planning units where commercial recreation guiding uses should be conditional on following established guidelines and/ or performance based standards for minimizing disturbance and impact on bird colonies and migratory bird habitat. These units are summarized in Table 23, along with recommended outline for development and scope of such guidelines.

Table 23. Summary of Areas Requiring Guidelines for Commercial Recreation Operating Practices

Affected Planning Units	All Planning Units
Participants & Process	CWS, WLAP to develop guidelines and /or performance based standards with LWBC. Tenure applicants to consult with appropriate agency as to availability of guidelines / standards.
Time Frame	Time frame for development established by agencies.
General Content	Location of sensitive species, type of species and habitat Species populations, lifecycle events e.g. breeding, rearing, feeding and migration. Species sensitivities during activities e.g. noise disturbance during breeding. Proposed operating activities and timing, distances.

5.5 Marine Conservation and Protection Assessments

Options for conservation and protection management include one or combinations of such designation tools as: provincial marine parks or federal National Marine Conservation Areas; Canada Oceans Act marine protected areas; fisheries closures; and permanent Land Act reserves.

DFO has recently initiated an integrated management planning process for the Central Coast region, pursuant to the July 2002 Canada Oceans Strategy and an associated policy for integrated management of coastal and marine areas. The policy provides for mechanisms to address marine conservation and protection requirements in marine ecosystems. These mechanisms will likely include regional bodies and processes capable of review and implementation of a strategy for conservation and protection of marine habitat on a regional basis.

Since the assessment and recommendation as to most appropriate conservation or protection tools for individual areas is a shared federal and provincial responsibility, the areas recommended in the Quatsino Sound Coastal Plan (see Table 24) an assessment process should be completed as part of a broader review of recommended areas across the Central Coast (including the North island Straits Coastal Plan and the marine

component of the Central Coast Land and Resources Management Plan). The process will also identify recommendations as to the most appropriate management option for each area. The outcomes for the areas identified in Table 24 will be reflected in the formal Quatsino Coastal Plan review and amendment, scheduled in year three of the Plan's implementation.

Table 24. Summary of Areas Recommended for Marine Conservation and Protection Assessments

Planning Unit No. & Name	Specific Area	Purpose & Sponsoring Agency
Unit 9: Winter Harbour	Browning Inlet salt marsh	marine conservation and protection WLAP and CWS
Unit 11: Quatsino Entrance	Gillam Islands	marine conservation and protection WLAP and CWS
Unit 12: Southern Approaches	Rowley Reefs	marine conservation and protection WLAP and CWS
Unit 14: Klaskish Inlet	East Creek estuary, Klaskish Narrows and Klaskish Basin	marine conservation and protection WLAP

5.6 First Nation Contacts and Considerations/ Provisions

The Province considers Quatsino First Nation involvement in reviewing planning unit recommendations as an opportunity to accommodate First Nations interests and information. Through such involvement, the Plan is intended to foster improved working relationships, reduced impact of land use activities on the Quatsino Nation's activities, and greater participation of the Quatsino Nation in economic development of resources.

As previously stated, the Plan is not binding on, and is not intended to limit treaty negotiations.

The Plan seeks to encourage tenure applicants to develop working relationships with the Quatsino First Nation. Such working relationships could include, but are not be limited to, discussions of the following:

- joint venturing or partnerships for development
- major Quatsino Nation involvement in operations
- training and employment of Quatsino Nation people in a development or tenure
- recognition and avoidance of applying for tenure in areas of significance to the Quatsino Nation
- use of Quatsino Nation support in marketing of a development or business
- guardian programs for marine conservation and recreation areas.

It is also recommended that non-tenured users of Crown foreshore and nearshore make efforts to engage the Quatsino Nation in discussion, where an activity is potentially in conflict or a source of friction with cultural values and sensitive sites.

Quatsino Nation Contact Information
Quatsino Band Office c/o Administrator phone: (250) 949-6245 fax: (250) 949-6249
P.O. Box 100
Coal Harbour, BC
V0N 1K0

5.7 Recommended Projects to Enhance Economic Development Opportunities

The Quatsino Plan identifies potential opportunities for use of foreshore and nearshore. However, availability of land is only one of several factors that determine the willingness of the private sector to apply for tenure in the area. Other factors such as policy constraints, lack of skills, training, infrastructure, transportation facilities, inspection facilities, and capital investment may create local barriers and constraints to future success of the NIS Plan.

Key recommendations for exploring and enhancing the development opportunities inherent in the Quatsino Coastal Plan Area are outlined below in Table 25.

Table 25. Economic Enhancement Projects in Quatsino Plan Area

Project	**Responsibilities** **Strategy description** **Projected completion date**
Area shellfish opportunity asessments	• DFO Habitat, LWBC, MAFF, MSRM(CMPB) • Undertake siting assessments across areas identified by the Plan as acceptable for shellfish beach and off-bottom aquaculture in order to expedite potential tenure referrals
Shellfish Development Officer	• DFO, MSRM, MAFF • Support the short term (approximately 1 year) staffing of a shellfish development officer to assist interested parties in

5.8 Plan Variation Process

Plan provisions that identify applications for a use in a planning unit as "inappropriate" or "acceptable only in its current location" may be challenged on a site-by-site basis. This process to vary the Plan's recommendations must be made in writing to the LWBC Service Centre Director by the proponent.

LWBC should only accept a request for Plan variation if it is based on one or more of the following conditions, which are to be specifically addressed in the letter of appeal:

- The proposed use is based on new technologies or methods of operation that were not available, not contemplated or not considered during development of the Plan;
- The proposed use represents, or is part of a new economic activity or venture that was not considered or contemplated during development of the Plan;
- The proposed use reflects changes in local community support, as reflected by evidence of local government and / or First Nations endorsement.

The recommended Plan variation process is as follows:

- The proponent provides a formal letter requesting Plan variation to the LWBC Service Centre Director, with relevant rationale and documentation, including geographic location of the proposal. A non-refundable fee will be levied by LWBC for accommodating the request.
- Within 15 days of receiving the appeal, the variation request letter will be distributed to a standing interagency resource management committee for consideration (or, in absence of this committee, to the Forests & Marine Planning Branch of MSRM).
- The committee will review the variation request and make a recommendation to the LWBC Service Centre Director within 60 days of receipt of the letter from LWBC. The proponent may be requested to make a presentation to the interagency management committee. The committee

will recommend acceptance or rejection of the variation request and any subsequent information required for inclusion in a tenure application if the request is upheld.

- LWBC will consider the recommendations of the committee and advise the appellant of the LWBC decision. If the decision is to accept an application, the proponent may complete the LWBC application form and the application will be processed according to LWBC standard procedures, subject to any other LWBC requirements or issues.
- LWBC acceptance and processing of an application based on a successful Plan variation request should not be interpreted as support for issuance of a tenure by LWBC or the interagency management committee.

A successful Plan variation request will not automatically result in change to the Plan's acceptable use provisions for that unit. Permanent change to such provisions may, however be made at the time of annual review if there have been a large number of variation requests.

The Plan variation process should be formalized through an agreement between the LWBC Service Centre Director and the MSRM Regional Director.

5.9 Plan Audit, Review and Amendment

Three years from the anniversary date of Plan approval, the Ministry of Sustainable Resource Management (MSRM) will prepare an audit report on tenure applications and approvals that addresses the degree of compliance with the Plan. A listing of interpretation issues, Plan variation requests and any public comments received during the three year period, as well as recommended plan amendments will be included in the report along with recommended actions or plan adjustments.

The audit report will be presented to the standing interagency committee chaired by MSRM. The committee will use this report as the basis of a formal Plan review, which may lead to the redrafting and reaffirmation of the Plan by government. The process for redrafting or reaffirmation will include discussions with affected local government, First Nations, members of the planning advisory committee, boards associated with integrated oceans management, and interest groups. Any revised or modified Plan will be posted on the MSRM website.

Appendix I. Governance Principles for Sustainable Resource Management in British Columbia

Definition of Sustainability

Optimizing economic development while protecting ecosystem integrity and enhancing well-being for all British Columbians, now and in the future

Governance Principles

The following ten principles are intended to guide government policy development and decision-making processes in accordance with its vision, core values and goals.

Accountability - Enhancing performance management through effective compliance, enforcement, auditing and public reporting activities.

Certainty - Making timely and clear decisions within a predictable and understandable framework.

Competitiveness - Ensuring that British Columbia remains internationally competitive by removing barriers to investment and promoting open trade.

Continual improvement & innovation - Learning from the past, adapting to changing circumstances, encouraging innovation and being entrepreneurial.

Efficiency - Focussed and efficient delivery of government services and maximizing the net benefits arising from the allocation, development and use of natural resources.

Inclusion - Including the interests of First Nations, and their desire to participate more fully in the economy of the Province.

Integration - Ensuring that decisions integrate economic, environmental and social elements, while considering the limits of each, for the benefit of present and future generations.

Science-based decision-making - Making justifiable decisions informed by science-based information and risk management.

Shared responsibility - Encouraging co-operation among First Nations; federal, provincial and local governments; academics; industry and non-governmental organizations in developing and implementing government policies.

Transparency - Establishing open and transparent decision-making processes that consider First Nations, the public and other key interests.

Appendix II. Federal and Provincal Legislation

Name	Responsible Agency	Authority	Coast¬l Management
BC Land Act	Ministry of Water, Land and Air Protection Land and Water BC Inc.	Governs uses of Crown lands through planning, leasing (e.g., aquaculture and shellfish harvesting), issuing easements (i.e., pipelines, power cables, etc.) or licensing to occupy (i.e., wharves, etc.) and setting policy for the disposition of Crown lands (i.e., sale or reservation). The Act provides that Crown land below the natural boundary of a body of water must not be disposed of by Crown Grant, except by order of the Lieutenant Governor in Council (i.e., almost all of the land below high tide remains the property of the provincial Crown).	The Act governs the initial, key decisions to allow any new or continuing activity on nearshore Crown land. Under the BC Land Act, authorities may prevent or allow uses that impact nearshore. It can be used to authorize the commitment of coastal areas for conservation under other statutes (e.g., Municipal Act, Park Act, Wildlife Act, etc.). Approval must be obtained before any building on or altering of upland, foreshore and intertidal areas. Recent changes in government legislation have moved the responsibility of day-to-day administration of land disposition from MWALP to the Land and Water BC Inc. (LWBC) including approving Crown land reserves, tenures and sale of Crown land. MWALP is now responsible for recommending and administering Crown land disposition and land-use legislation and policies.
BC Land Title Act	Ministry of Water, Land and Air Protection Land and Water BC Inc.	Regulates the registration of legal title for and subdivision of all lands. Provides authority for the registration of covenants against a title and the designation of conservation organizations authorized to enter into	Provisions of the Act require the dedication of public access to marine water when waterfront land is subdivided. Covenants can be used to protect habitats by landowners, Crown agencies and designated conservation organizations.
BC Wildlife Act	Ministry of Water, Land and Air Protection	Regulates game harvest limits and methods, the import, export, possession or transport of wildlife or disturbance of wildlife. It authorizes the purchase of private land and the creation of Wildlife Management Areas and Wildlife Sanctuaries. It provides for the designation of endangered or threatened vertebrates and the protection of their habitats within a Critical Wildlife Management Area.	The Act contains limited prohibitions against the damage or destruction to wildlife habitat, including the nests of birds and lands within a Wildlife Management Area. There is no requirement to list endangered or threatened species or to protect their habitats. New law to control the introduction and possession of alien species is under consideration.
BC Park Act	Ministry of Water, Land and Air Protection	Authorizes securing land for provincial parks; regulates all uses in provincial parks.	The Act is one of the main avenues for the province to establish Marine Protected Areas. Previous marine park development has generally been for recreational purposes. However, BC Parks Conservation Management: Part One Conservation Program Policies for marine systems provides a strong conservation focus for new parks. The Act strictly controls and limits impact on habitats in parks and recreation areas. However, the Act does not have the authority to establish strict no-taking of fish (i.e., establish refugia capability).

Name	Responsible Agency	Authority	Coastal Management
Local Government Act	Ministry of Community, Aboriginal and Women's Services	The Act authorizes municipal and regional governments to exercise authority over land use planning, regulation (i.e. zoning), development approval, and servicing in their jurisdiction. Local government authority applies to all lands. However, the local government regulation of Crown land is subject to Section 4 of the Interpretation Act which gives the province prerogative where using lands for its own purpose. Federal lands are not subject to local jurisdiction (i.e. Indian Reserves). The provincial government retains senior authority and can be the primary regulator of land use. Local government powers are limited over lands designated for forestry or agriculture. Local governments have jurisdiction over intertidal and subtidal lands subject to the Interpretation Act. The provincial government amended the Local Government Act in 2000 to provide regional districts and their member municipalities with a framework for creating strategies to control growth at the regional level. The amendment included provincial goals to guide the development of regional growth strategies. A further amendment in 1997 enables local governments to address the protection, restoration and enhancement of the natural environment, its ecosystems and biodiversity. The authority to develop Official Community Plans (OCPs) affords the designation of lands for open space or conservation. Powers to create bylaws can be used to protect shorelines, trees, wetlands and watercourses and to control soil removal and flooding.	Land use zoning can positively or negatively impact nearshore habitat or other lands whose use can affect nearshore habitats. For example, zoning can be used to create buffers around wetlands and to regulate uses around sensitive habitats. OCPs can require proponents to assess environmental impacts of proposed developments, to provide disposal of surface run-off and storm water and to limit the area covered by impermeable materials in any development. Municipalities can exempt landowners from property tax on riparian land subject to a conservation covenant held by the municipality. Where new bylaws come into effect, existing uses can continue as nonconforming until such time as a landowner applies for a structural alteration, change of use or subdivision. Municipalities and regional governments can buy sensitive habitats for parks and heritage conservation. They can also regulate sewage works and waste removal. Local authorities can prevent environmental impacts whereas many federal and provincial authorities only provide for redress after damage has occurred. Local governments are not compelled to protect, restore or enhance nearshore or other habitats, although they must meet provincial water quality objectives set under the BC Waste Management Act. Generally, most local governments do not have the staff expertise or financial resources to address habitat interests, and require federal or provincial support. Local governments are likely to request financial support from the federal or provincial governments to buy land or for other forms of compensation.
BC Mines Act	Ministry of Energy and Mines	Regulates the exploration, development, operation and closure of mining operations. Permits or licences are required for those activities. The Act	A moratorium on oil, gas and mineral exploration off B.C.'s coast, established in 1972, remains in place. The federal and provincial governments have not yet reached agreement on the development of those resources and how to share

Name	Responsible Agency	Authority	Coastal Management
		authorizes the creation of a mine reclamation fund to cover the costs of mine reclamation where the owner fails to do so. The posting of security to mitigate impacts to watercourses and to reclaim a mine can be required.	revenues.
Mineral Tenure Act	Ministry of Energy and Mines	The Province grants surface and subsurface rights separately. Some parcels of private land granted in earlier years included subsurface rights. For the most part, the Province owns all mineral rights on what is generally called "mineral lands" which includes both private and Crown land. Individuals and companies may acquired these rights from the Province. Mineral rights are issued by the Mineral Titles Branch of the Ministry of Energy and Mines according to the Mineral Tenure Act. Mineral rights exclude earth, soil, marl, peat, sand, gravel and rock used for construction purpose. There is currently a federal and provincial moratorium on the exploration and development of offshore oil and gas deposits and the Province has suspended the issuance of mineral, placer and coal tenure over subtidal and intertidal lands. While there is no moratorium on offshore mineral development there is no comprehensive policy framework to guide such activity.	Staking and subsequent exploration and development activities may occur on coastal nearshore lands under the Act. The Mineral Tenure Act, Coal Act, Mines Act and associated Mineral Exploration Code contain strong provisions for recognizing and minimizing potential impacts on the environment, wildlife and other special values.
Animal Disease Control Act	Ministry of Agriculture, Food and Fisheries	The Act, administered by the Provincial Veterinarian, provides a statutory authority to limit the spread of contagious diseases in animals, including aquatic animals. Discussed are the duties and powers of inspectors appointed under the Act, obligations of owners of animals and quarantine procedures.	Limiting the spread of contagious diseases in aquaculture operations decreases the risk of infection of wild fish stocks in the vicinity and also increases the economic sustainability of the industry and the coastal communities to which it contributes.
Farm Practices Protection (Right to	Ministry of Agriculture, Food and Fisheries	The Act enables farmers to farm in agricultural land reserves or on licensed aquaculture sites by exempting them from nuisance lawsuits, nuisance bylaws and	These provisions help to ensure sustainable management of the aquaculture industries, by ensuring a cooperative arrangement for land use regulation between local governments, industry and the provincial government. The complaint

Name	Responsible Agency	Authority	Coastal Management
Farm) Act		prohibitive injunctions if they employ normal farm practices. It also ensures that a local government may not restrict normal farm activities without approval from the Minister of Agriculture, Food and Fisheries. The Act establishes a complaint resolution process, which includes the establishment of a Farm Practices Board. The Minister may also publish and distribute standards in relation to farming areas, including licensed aquaculture sites, for the guidance of local governments in preparing rural land use bylaws, zoning and other bylaws. Local governments may also make bylaws to regulate of farm activities subject to approval of the Minister of Agriculture, Food and Fisheries	resolution process also provides an efficient and cost-effective way to ensure that marine aquaculture activities adhere to normal farm practices, thereby contributing to the social sustainability of coastal communities. The complaint resolution process could also be used as a vehicle to address and mitigate microbial contamination of shellfish growing areas from upland agricultural pollution.
Farming and Fishing Industries Development Act	Ministry of Agriculture, Food and Fisheries	The purpose of this Act is to enable producers of commodities of the farming and fishing industries to collect levies approved by the Lieutenant Governor in Council. The Minister can establish a council to administer the levied funds for the benefit of the industry by way of market development, promotion and research.	While not directly related to the management of coastal resources, this Act affects the economic sustainability of seafood industries on the coast, thereby affecting the sustainability of coastal communities.
Fish Inspection Act	Ministry of Agriculture, Food and Fisheries	The Act ensures quality and wholesomeness in the fish industry by providing the authority to regulate activities concerning the handling, processing, storing, grading, packaging, marking, transporting, marketing and inspection of fish and fish products. The regulations ensure that fish processed and sold within British Columbia have met specific requirements.	This ensures that efforts are made throughout the production line to maintain high food quality. Given that the quality of the food depends to a significant degree on the quality of the seafood-growing environment, the seafood industries will seek growing and harvesting areas that have high quality. This influences the land allocation process because a variety of other resource users in addition to the seafood industries often compete for sites in a high quality environment, necessitating careful and equitable resource planning and allocation at local and site-specific scales.
Fish Protection Act	Ministry of Water, Land and Air Protection Ministry of Agriculture, Food and Fisheries	The Act is primarily implemented by the Ministry of Water Land and Air Protection, and protects the province's fisheries resource by ensuring water for fish, protecting and restoring fish habitat, focusing on riparian protection and enhancement, and	Maintaining fish habitat on upland areas helps to ensure the quality of coastal environments as well as the sustainability of anadromous fish. The provision for marine planning also provides a mechanism to maintain the quality of marine environments for fish.

Name	Responsible Agency	Authority	Coastal Management
		strengthening local environmental planning, including marine areas.	
Fisheries Act	Ministry of Agriculture, Food and Fisheries	The Act provides for the licensing and regulatory control of activities associated with commercial fisheries and aquaculture operations. The primary concerns are the licensing of: fish processing plants; fish buying establishments; fishermen selling their own catch; wild oyster and marine plant harvesting; and all commercial aquaculture operations within the province, whether on private or Crown land. This Act provides the mechanism for regulatory control over aquaculture and provincially regulated fish harvesting in marine areas. As such it helps to ensure the sustainability of coastal marine areas through a number of regulatory provisions attached to Aquaculture Licences or harvesting permits as well as inspection and enforcement staff and activities.	This Act provides the mechanism for regulatory control over aquaculture and provincially regulated fish harvesting in marine areas. As such it helps to ensure the sustainability of coastal marine areas through a number of regulatory provisions attached to Aquaculture Licences or harvesting permits as well as inspection and enforcement staff and activities.
Canada Oceans Act	Department of Fisheries and Oceans Canada (DFO)	The Act is a consolidation of Canada's ocean-related legislation. It provides authority for the DFO Minister to lead the development of a strategy and integrated management plans for estuarine, coastal and marine ecosystems based on public input and the principles of sustainable development, integrated management and the precautionary approach. The Act affords the creation of national Marine Protected Areas. Marine Protected Areas may be designated for the conservation and protection of commercial and non-commercial fishery resources, which includes, for the purposes of this Act: marine mammals and their habitats; endangered or threatened marine species; unique habitats; marine areas of high biodiversity or biological productivity; or any other marine resource or habitat necessary to fulfil the Minister's mandate.	The Act can be used for the development of a coast wide strategy for the maintenance and management of marine ecosystems and the creation and protection of marine protected areas. The authority to control harmful activities is limited to marine protected areas

Name	Responsible Agency	Authority	Coastal Management
Canada Fisheries Act Canada	Department of Fisheries and Oceans Canada	Regulates fish harvest limits and methods, the import, export, possession, rearing or transport of fish, or the harming of fish or their habitat2. The Minister has authority to require plans and specifications to assess a proposed activity in significant fish habitat and to require mitigation of impacts to fish habitat. Freshwater-fish harvest, aquaculture and fish farms are regulated by MWLAP in cooperation with DFO.	Facilitates the setting of safe harvest limits and affords prevention of harvest or harvest methods that impact fish. The Act prohibits any alteration of, destruction of, or damage to habitat, including harmful substances, such as sewage, except as may be authorized by regulations or the Minister. Mitigation measures may include the placement and maintenance of fishways, barrier screens, etc. The Act can regulate the introduction of exotic, marine species through shipping. Regulations set minimum standards for BOD, TSS and non-toxic effluents.
National Marine Conservation Areas Act	Parks Canada	Provides authority to create large national marine protected areas that can be zoned for multiple uses.	Can protect significant marine areas (i.e., much of Moresby Island within the Queen Charlotte Islands).
National Park Act	Parks Canada	Provides federal authority to establish and manage national parks and protected areas through fees, simple acquisition, or the transfer of provincial Crown land.	The Act affords opportunities to create national parks on land. The Marine Conservation Area Act (not promulgated) provides the legislated bases to establish marine protected areas.
Canada Wildlife Act	Environment Canada	Provides federal authority to establish and manage National Wildlife Areas through fees, simple acquisition, or the transfer of provincial Crown land.	The Act affords opportunities to create National Wildlife Areas, but only over land or marine areas under control of Environment Canada.
Migratory Birds Convention Act	Environment Canada	Regulates the harvest, possession and transport of migratory birds.	It is the federal legislation used to establish annual, sustainable harvest levels for migratory game birds
Canada Environmental Assessment Act	Environment Canada	Regulates the review and approval of federally funded, initiated or regulated activities. Environmental assessments may also be triggered by a number of provisions under the Canada Fisheries Act. Screenings or assessments are required for most new or expanded activities on federal Crown lands.	It is harmonized with the BC Environmental Assessment Act. Coastal habitats can be protected on federal and provincial Crown lands and private lands. Full public reviews are required of projects involving significant impacts.
Canadian Environmental Protection Act	Environment Canada	Regulates the production and control of toxic substances, including their development, manufacture, importation, transportation, distribution, storage, use, environmental release and disposal. Regulates	The Act assures safe limits on the entry of toxic substances into nearshore habitats. A 96% reduction in dioxins and a 97% reduction in furans occurred in pulp-mill effluents between 1990 and 1994, following enactment of regulations in 1990 and 1992. Fish and other aquatic organisms may still suffer persistent ill effects from those and other

Name	Responsible Agency	Authority	Coastal Management
		ocean dumping and, as part of the approval process, it requires public notification. Minimum national standards are set by regulation for the discharge of chlorinated dioxins and furans and for the elimination of those same chemicals from defoaming agents and wood chips used in the manufacture of pulp.	chemicals. Studies are underway to determine if such effects are present.
Canadian Species at Risk Act	Environment Canada	Intended to prevent endangered or threatened wildlife from becoming extinct or lost from the wild, and to help in the recovery of these species. It is also intended to manage species of special concern and to prevent them from becoming endangered or threatened and implement recovery plans for those species listed as threatened or endangered	Implementation may involve the development of Conservation Agreements relating to Species at Risk, which can include: monitoring the status of the species; developing and implementing education and public awareness programs; developing and implementing recovery strategies, action plans and management plans; protecting the species' habitat, including its critical habitat; or undertaking research projects in support of recovery efforts for the species.
Navigable Waters Protection Act	Transport Canada	Regulates the placement of any structures in navigable waters.	It can be used to prohibit or limit the placement of structures in intertidal and subtidal habitats.
Canada Marine Act	Transport Canada	Authorizes the establishment of Port Authorities and other matters related to maritime trade and transport. It provides environmental assessment regulations for port activities and developments under the Canadian Environmental Assessment Act and the Canada Shipping Act.	The authorities established for each port authority may require provisions for the development or protection of coastal habitats.

Links to Federal Policy

Canada's Oceans Strategy

http://www.cos-soc.gc.ca/doc/publications_e.asp

National Policy and Operational Framework for Integrated Management of Estuarine, Coastal, and Marine Environments in Canada

http://www.cos-soc.gc.ca/doc/publications_e.asp

Habitat Conservation Protection Guidelines (1998)

http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/fhmguide/index_e.asp

Policy for the Management of Fish Habitat (1986)

http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/legislation-lois/policies/fhm-policy/index_e.asp

Links to Federal Legislation related to the management of Canada's Oceans

Specific Acts and legislation can be accessed through Justice Canada on the Internet at:

http://laws.justice.gc.ca

Oceans Act
Coastal Fisheries protection Act
Fisheries and Oceans Canada Act
Fisheries Act
Fisheries Prices Support Act
Fishing and Recreational Harbours Act
Canada Oil and Gas Operations Act
National Energy Board Act
Resources and Technical Surveys Act
Canada Shipping Act
Canadian Environmental Assessment Act
Navigable Waters Protection Act
Canadian Wildlife Act
Canadian Environmental Protection Act
Canadian Laws Offshore Application Act
Carriage of Goods by Water Act
Coastal Fisheries Protection Act
Customs Act
Customs and Excise Offshore Application Act
Dominion Water Power Act
Fisheries Development Act
Fisheries Improvement Loans Act
Harbour Commissions Act
Marine Insurance Act
Marine Transportation Security Act
Migratory Birds Convention Act
Territorial Sea and Fishing Zones Act
Export and Import Permits Act
Canada Ports Corporation Act
Canada Transportation Act

Appendix III. First Nation, Agency and Interest Group Discussions

Table A.1 Summary of Government Agency and Interest Group Meetings

Agency or Interest Group	Location & No. of Meetings
Quatsino First Nation	Coal Harbour/Port Hardy (6)
Public Advisory Committee	Port Hardy (7)
Public Open Houses	Holberg (8 total)
	Coal Harbour
	Port Alice
	Quatsino
BC Salmon Farmers Association	Campbell River (2)
Land and Water BC Inc.	Nanaimo (3)
Mount Waddington Regional District	Port McNeill (2)
Ministry of Forests	Campbell River (1)

Appendix IV. Vancouver Island Summary Land Use Plan Direction

SMZ-2: West Coast Nahwitti Lowlands	
Location:	zone extending along coastline south-east of Cape Scott Park; encompassing Raft Cove protected area; zone is adjacent to RMZ 4 (San Josef - Koprino)
Total Area:	approximately 15,100 ha
Primary Values (see LIARC report)	Scenic values visible from marine zone and access routes Cultural/ heritage values Coastal fish and wildlife habitats and populations (entire coast, plus riparian in Macjack R. and Ronning Cr., Topknot and Leeson Lakes) Coastal recreation values and opportunities
Zone category and Overall Management Guidance	Special Management Zone: main focus should be on special management for significant scenic and recreational values which are concentrated along narrow coastal strip; additional consideration should be on maintenance of the high riparian fish and coastal wildlife values
Primary Objectives	
Visual Resources:	Description: highly visually sensitive viewsheds, confined to strip along coast; areas further upland within the SMZ are less visually sensitive Objective: Special Visual Resource Management in areas visible from coast and along access routes Strategies: manage viewsheds visible from park areas as scenic areas
Recreation Resources:	Description: coastal recreation: beaches, trails, kayaking, whale watching in strip along coast; areas further upland within the SMZ are less significant for recreation Objective: Special Recreation Resource Management with emphasis along coast
Tourism Resources:	Description: high potential in coastal influence area; less significant values in lower Ronning and Macjack Creek areas Objective: Special Tourism Management with emphasis on coastal influence area
Wildlife:	Description: coastal habitats: bald eagle, sea otters, amphibians; lower values for upland species Objective: Special Wildlife Management Strategies: need for developing habitat conservation measures for coastal species
Fish:	Description: known anadromous values in Macjack, Kwatleo systems and lower reaches of other creeks Objective: General Fish Management
Water:	Description: high watershed integrity Objective: General Watershed Management
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Secondary Objectives	
Biodiversity:	Description: this zone is encompassed by the San Josef and Koprino draft landscape units, which also encompass RMZ-4, as well as Cape Scott and Raft Cove parks; CWHvh1 is the dominant ecosystem type, with some CWHvm1 (eastern portion of zone) Objective: General Biodiversity Conservation Management Strategies: to the extent that old seral forest retention will be required within the contributing land base portions(18) of the landscape units, such retention should be concentrated(19) within the SMZ-portion of the landscape units, with focus on (expanded) riparian habitats, as well as potential marbled murrelet habitat
Timber:	Description: moderate productivity, high proportion of mature timber

	Objective: Special Timber Resource Management Strategies: due to high winds and forest health considerations, preference should be given to retention silvicultural systems, rather than selection and shelterwood systems; reserve trees/groups should be selected for windfirmness, amongst other criteria
Cave/Karst:	Objective: General Cave/Karst Management
Access:	Objective: General Access Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: some moderate potential for finfish culture and shellfish culture.

SMZ-3: Brooks Bay

Location:	extending along the south side of Quatsino Channel to Klaskino Inlet
Total Area:	approximately 10,200 ha
Zone category and overall Management Guidance	main focus should be to maintain and/or restore the high scenic/tourism/recreational values, as well as coastal, riparian and upland habitat values
Primary Values (see LIARC report)	Coastal visual quality and associated recreation opportunities Anadromous fish values and estuary fish rearing habitat Marine endangered /threatened species and habitat
Primary Objectives	
Visual Resources:	Description: almost entire zone is highly visually sensitive Objective: Special Visual Resource Management Strategies: maintain viewsheds visible from park and water; restore visual quality where it has been impacted (e.g. Red Stripe Mountain, Side Bay, Klaskino Inlet)
Recreation Resources:	Description: features and opportunities associated with coastline; prime kayaking area; upland recreation potential in lower Klaskish and East Creek areas Objective: Special Recreation Resource Management
Tourism Resources:	Description: coastal hiking, kayaking and lodge/resort potential Objective: Special Tourism Management with emphasis on above areas
Wildlife:	Description: sea otter habitat between Restless Bight and Cliffe Point; high value estuary habitats in Harvey Cove and Side Bay; ungulate winter ranges; marbled murrelet detections in Klaskish/East Creek; Objective: Special Wildlife Management for upland habitats Strategies: develop habitat management strategies for coastal species
Fish:	Description: known anadromous fisheries in LeMare, Klaskish and East Creek systems (esp. estuaries), as well as lower reaches of smaller coastal streams; particularly high salmon values in East Creek and Klaskish Objective: General Fish Management
Water:	Description: some extensively harvested areas Objective: General Watershed Management Strategies: deactivation of roads; rehabilitation of disturbed areas
Secondary Objectives	
Biodiversity:	Description: this zone is part of the Mahatta and Klaskish draft landscape units, which also encompass portions of RMZ 8 and 9; high values associated with marine and riparian habitats; dispersed ungulate values Objective: Special Biodiversity Conservation Management in parts of the zone situated

	within the Klaskish draft LU; Basic Biodiversity Conservation Management in remaining portions of the zone (part of Mahatta draft LU) Strategies: to the extent that old seral forest retention will be required within the contributing land base portions(20) of the landscape units, such retention should be concentrated(21) within the SMZ-portion of the landscape units and where necessary to conserve marbled murrelet habitat
Timber:	Description: moderate to high productivity, mix of mature and second growth timber Objective: Special Timber Resource Management Strategies: due to high winds and forest health considerations, preference should be given to retention silvicultural systems, rather than selection and shelterwood systems; reserve trees/groups should be selected for windfirmness, amongst other criteria
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Cave/Karst:	Objective: General Cave/Karst Management
Access:	Objective: General Access Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: some moderate potential for finfish culture, shellfish culture potential unknown

SMZ-4: Koprino

Location:	situated between Jules Bay and Koprino Harbour, connecting to SMZ 2 in the south-east
Total Area:	approximately 16,100 ha
Primary Objectives	
Primary Values (see LIARC report)	Old growth biodiversity and connectivity functions Upland wildlife habitat
Zone category and overall Management Guidance	this SMZ should become a focal area (within the landscape unit) for the retention of old forest and associated wildlife habitat, as well as for mature and old forest connectivity
Wildlife:	Description: deer and elk winter range; good year-round capability for deer, elk, wolves, bears, cougars, grouse, goshawk and amphibians; waterfowl wintering areas in Koprino Harbour Objective: Special Wildlife Management;
Fish:	Description: known anadromous fisheries in Hathaway Creek and Koprino River Objective: General Fish Management
Biodiversity:	Description: this zone is part of the San Josef draft landscape unit which also comprises portions of RMZ-4; mostly CWHvm1; high proportion of old forests Objective: General Biodiversity Conservation Management Strategies: to the extent that old seral forest retention will be required within the contributing land base portions(22) of the landscape unit, such retention should be highly concentrated(23) within the SMZ-portion of the landscape unit; maintain old forest connectivity within the SMZ
Water:	Description: some sensitive terrain, low equivalent clearcut area Objective: General Watershed Management
Secondary Objectives	
Timber:	Description: high productivity, mostly mature timber Objective: Special Timber Resource Management

Visual Resources:	Description: mostly not visually sensitive, except in Jules Bay area Objective: General Visual Resource Management with emphasis in Jules Bay area
Recreation Resources:	Description: secondary, except in Koprino Harbour area Objective: General Recreation Resource Management
Tourism Resources:	Description: associated with Jules Bay and Koprino Harbour Objectives: General Tourism Management with emphasis in above areas
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Cave/Karst:	Objective: General Cave/Karst Management
Access:	Objective: General Access Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: some moderate potential for finfish culture and good shellfish culture potential in Koprino Harbour

RMZ-4: San Josef-Koprino

Location:	bounded by Cape Scott Park and SMZ 2 to the west, extending south-east, bounded by Holberg Inlet and Quatsino Sound; includes Ahwhichaolto Peninsula
Total Area:	approximately 56,000 ha
Zone category and overall Management Guidance	Enhanced Forestry Zone suited for enhanced timber harvesting and production, while maintaining fish values and watershed integrity
Primary Objectives	
Timber:	Description: generally highly productive ground, with over 50% of forest cover over 120 years old Objective: Enhanced Timber Harvesting and Enhanced Silviculture
Fish:	Description: fisheries values generally lower, intermediate for San Josef River Objective: General Fish Management
Biodiversity:	Description: this zone is part of the San Josef draft landscape unit, which also comprises Cape Scott park and SMZs 2 and 4; CWHvh1 and CWHvm1 are the dominant BEC variants in this zone; CWHvh1 is well represented in Cape Scott park; CWHvm1 is underrepresented in this ecosection (Nahwitti Lowlands), but well represented in the Windward Mountains ecosection; additionally, riparian reserves and management zones, as well as SMZs capture CWHvm1 forests; Objective: General Biodiversity Conservation Management Strategies: emphasis should be on maintaining old seral forests mainly in riparian reserves and other excluded areas within this zone, as well as in the SMZ portions of the two draft landscape units
Secondary Objectives	
Access:	Access: Objective: General Access Management
Water:	Description: areas within this zone have experienced extensive timber development and may reach critical equivalent clearcut area levels; areas of sensitive slopes and terrain occur in this zone. Objective: General Watershed Management Strategies: emphasis on monitoring hydrological peak flow indicators.
Visual	Description: visually sensitive areas of local significance identified in Coal Harbour area,

Resources:	Quatsino and Jules Bay and along access route to Cape Scott park Objective: General Visual Resource Management
Recreation Resources:	Description: River based recreation, particularly angler and camping/canoeing opportunities in lower San Josef. Objective: General Recreation Resource Management
Tourism Resources:	Description: some coastal tourism capability along Holberg Inlet; facilities in Quatsino Objective: General Tourism Management
Wildlife:	Description: few dispersed pockets of ungulate winter range, mainly in lower San Josef River area; inventory lacking Objective: General Wildlife Management Strategies: maintain black bear habitat through stand level forest management practices (e.g. placement of wildlife tree patches)
Cave/Karst:	Description: karst terrain and features occur in various locations Objective: General Cave/Karst Management
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: some moderate to good potential for coastal finfish and shellfish culture
Mineral Resources	Description: High metallic mineral potential, moderate industrial mineral potential; many mineral tenures.
Aquaculture:	Description: some moderate potential for finfish culture and good shellfish culture potential in Koprino Harbour

RMZ-5: Holberg	
Location:	zone extending along northeastern shore of Holberg Inlet to Port Hardy
Total Area:	approximately 40,500 ha
Zone category and overall Management Guidance	Enhanced Forestry Zone suited for enhanced timber harvesting and production, while maintaining fish values and watershed integrity
Primary Objectives	
Timber:	Description: generally highly productive ground, with approximately 1/3 of forest cover over 120 years old Objective: Enhanced Timber Harvesting and Enhanced
Fish:	Description: fisheries values generally lower Objective: General Fish Management
Community Water:	Description: Calbick Creek drainage area is a designated community watershed Objective: Community Watershed Management in community watershed
Secondary Objectives	
Access:	Objective: General Access Management
Water:	Description: areas within this zone have experienced extensive timber development and may reach critical equivalent clearcut area levels; areas of sensitive slopes and terrain occur in this zone; Quatse Lake is important for local water supply and proposed for community watershed designation Objective: General Watershed Management Strategies: emphasis should be on monitoring hydrological indicators

Visual Resources:	Description: visually sensitive areas of local significance identified along access route to Cape Scott Park, and along Holberg Inlet Objective: General Visual Resource Management
Recreation Resources:	Description: very localized opportunities Objective: General Recreation Resource Management
Tourism Resources:	Description: some coastal tourism capability along Holberg Inlet; heritage tourism values in Coal Harbour Objective: General Tourism Management
Wildlife:	Description: lower wildlife values Objective: General Wildlife Management
Biodiversity:	Description: this zone is comprised by the Holberg draft landscape unit; CWHvm1 is the dominant BEC variant in this zone Objective: Basic Biodiversity Conservation Management Strategies: emphasis should be on maintaining old seral forests in riparian reserves and other non-contributing areas.
Cave/Karst:	Description: karst terrain and features occur in various locations Objective: General Cave/Karst Management
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: moderate to good potential for coastal finfish and shellfish culture
Mineral Resources	Description: High metallic mineral potential, moderate industrial mineral potential; many mineral tenures.

RMZ-8: Mahatta-Neroutsos

Location:	bounded by Quatsino Sound and Brooks Bay SMZ to the north and west, extending east surrounding Neuroutsos Inlet; in Windward Mountain ecosection.
Total Area:	approximately 64,800 ha
Zone category and overall Management Guidance	Enhanced Forestry Zone suited for enhanced timber harvesting and silviculture; wildlife values in Mahatta system (esp. in Mahatta draft landscape unit) and marbled murrelet values in noted drainages require specific integration through maintenance of old seral forest; objectives for other resources are to be integrated at the basic stewardship level in accordance with the Code requirements
Primary Objectives	
Timber:	Description: highly productive for timber production; approximately 50% of mature forest remaining Objective: Enhanced Timber Harvesting and Enhanced Silviculture
Wildlife:	Description: high marbled murrelet detections in Teeta, Cayuse, and Cayeghle; moderate (Mahatta draft LU) to lower ungulate wildlife values Objective: General Wildlife Management Strategies: emphasis should be on retaining old seral forest in accordance with biodiversity objectives (see below) for maintenance of marbled murrelet habitat in above noted drainages; manage and conserve known ungulate winter ranges
Fish:	Description: moderate to high fish values, particularly in Mahatta River, Cayuse, Colonial and Cayeghle Creeks Objective: General Fish Management with emphasis on above noted drainages
Secondary Objectives	

Access:	Objective: General Access Management
Water:	Description: areas with unstable terrain, as well as drainages with significant amount of early seral stage forests occur in this zone Objective: General Watershed Management Strategies: hydrological monitoring indicated
Visual Resources:	Description: few areas, mainly along Quatsino Inlet and across from Port Alice are classified as visually sensitive (local significance) Objective: General Visual Resource Management with emphasis on above areas
Recreation Resources:	Description: steelhead fishery in lower Mahatta River (steelhead fishery), and land/water interface and anchorages in Drake Island and Kultus Cove areas are of regional significance Objective: General Recreation Resource Management
Tourism Resources:	Description: mainly associated with coastline along Quatsino and Neuroutsos Inlets; lodge and resort capability in Teeta Creek area Objective: General Tourism Management
Biodiversity:	Description: this zone is comprised by the Mahatta and Neuroutsos draft landscape units; all subzones/variants are well represented in PAs Objective: Basic Biodiversity Conservation Management Strategies: consider retaining more than one third of the old seral target if necessary to accommodate marbled murrelet habitat needs (refer to wildlife strategies)
Cave/Karst:	Description: occurrence of cave/karst terrain and features along Neuroutsos Inlet Objective: General Cave/Karst Management
Cultural Heritage Resources:	Objective: General Cultural Heritage Resource Management
Non-Forest Resource Descriptions	
Aquaculture:	Description: considerable good potential for coastal finfish and shellfish culture
Mineral Resources	Description: Moderate to high metallic mineral potential; low industrial mineral potential; some mineral tenures.

Appendix V. Compatibility & Siting Assessments

Decision Rules For Determination of Acceptable Uses and Activities in Quatsino Sound Coastal Planning Units

General Considerations:

A use is initially identified as acceptable if the use already exists and is tenured in a unit.

An existing use initially identified as acceptable (in #1 above) is changed to acceptable in current location if information and input determines there is an expectation of significant user or resource conflicts; or if the unit is unable to support additional uses due to a lack of capable areas that meet established siting criteria.

A use is initially identified as conditionally acceptable if it does not exist in the unit, and would be considered potentially compatible with existing values and resources, depending on the submission of more specific information with a tenure application. Such information could include: biophysical capability, results of a required review process, completion of a campsite strategy, or development of operating guidelines.

A use is initially identified as inappropriate if the use is currently not present in the unit and: the biophysical capability assessment of the area shows no or poor capability for the use; if information and input determines there is an expectation of significant user or resource conflicts, or if the use is considered incompatible with adjacent upland designations

An activity (i.e. not tenured or managed by the provincial government) is identified as an ongoing, non-tenured activity if it is known to be taking place in a unit.

Specific Considerations:

Compatibility Matrix between Foreshore & Nearshore Uses on the Same or Adjacent Site

		Aquaculture				Docks, Wharves and Facilities								Log Booming Ground	Log Handling Facilities	Helicopter log-Drops	Marine Residential	Floating Lodges and Base Camps	Boat Launches	Commercial Recreation Guiding	Marine Telecommunications and Utilities	Conservation
		Shellfish Beach	Shellfish Deepwater	Finfish	Marine Plant	Private Residential Moorage	Light Industrial/ Commercial	Light Public (Pedestrian)	Heavy Commercial	Heavy Industrial	Heavy Public (Vehicle)											
Aquaculture	Shellfish Beach	✓																				
	Shellfish Deepwater	✓	✓																			
	Finfish	X	✓	✓																		
	Marine Plant	✓	✓	✓	✓																	
Docks, Wharves & Facilities	Private Residential Moorage	X	✓	✓	✓	✓																
	Light Industrial/ Commercial	X	✓	✓	✓	✓	✓															
	Light Public (Pedestrian)	X	✓	✓	✓	✓	✓	✓														
	Heavy Commercial	X	X	X	X	✓	✓	✓	✓													
	Heavy Industrial	X	X	X	X	✓	✓	✓	✓	✓												
	Heavy Public (Vehicle)	X	X	X	X	✓	✓	✓	✓	✓	✓											
	Log Booming Ground	X	X	X	X	X	X	X	✓	✓	✓	✓										

	Aquaculture				Docks, Wharves and Facilities															
	Shellfish Beach	Shellfish Deepwater	Finfish	Marine Plant	Private Residential Moorage	Light Industrial/ Commercial	Light Public (Pedestrian)	Heavy Commercial	Heavy Industrial	Heavy Public (Vehicle)	Log Booming Ground	Log Handling Facilities	Helicopter log-Drops	Marine Residential	Floating Lodges and Base Camps	Boat Launches	Commercial Recreation Guiding	Marine Telecommunications and Utilities	Conservation
Log Handling Facilities	X	X	X	X	X	X	X	✓	✓	✓	✓	✓							
Helicopter Log Drops	X	X	X	X	X	X	X	X	X	X	✓	✓	✓						
Marine Residential	X	X	X	X	✓	✓	✓	X	X	X	X	X	X	✓					
Floating Lodges and Base Camps	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	✓				
Boat Launches	X	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓			
Commercial Recreation Guiding	X	X	✓	✓	✓	✓	✓	X	X	X	X	X	X	✓	✓	✓	✓		
Marine Telecommunications and Utilities	✓	X	X	X	✓	✓	✓	✓	✓	✓	X	X	X	✓	✓	✓	✓	✓	
Conservation	X	X	X	✓	✓	X	✓	X	X	X	X	X	X	X	X	X	✓	X	✓

✓ compatible uses X incompatible uses

References are intended to clarify how management direction may vary depending on specific circumstances. Where no source is cited, management direction is considered to apply in all situations

Key:
A: Acceptable
M: Specific Management Provisions required to address interaction. Refer to management direction in for specific planning units
S: Siting Criteria established to address interaction
T: Timing window established to address activities/uses during critical periods
NC: Not Compatible – no overlap permitted

Sources:
MOU: November 2001 MOU between BCAL (LWBC) and Provincial Referral Agencies
SMP: Provincial Shellfish Management Plan – MAFF/LWBC
FMP: LWBC Commercial Finfish Aquaculture Management Plan Schedule C

Marine and Intertidal Structures

Structure Type	Structure	Purpose	Potential Environmental Considerations	Comments
Fill	Groynes	groynes: intended to trap sediment moving along the shore to reduce or eliminate site-specific erosion	erosion transfer burial of benthic habitat wave energy alteration reduction in flushing biophysical changes construction impacts	Utility is dependent upon detailed studies of prevailing coastal processes prior to construction
	Breakwaters	designed to protect a shore area, harbour or anchorage from waves. Breakwaters may be floating (provide limited protection as wave energy can pass beneath) or bottom founded (more resistant to wave energy but limited in size by cost).		design factors include: wave height, length, direction effects of the structure on wave refraction and erosion
	Revetments	hard smooth surfaces placed on a bank or bluff to protect it against erosion by wave action and currents	hardening & straightening of shores disruption of longshore drift wave energy alteration burial of benthic habitat construction impacts	
	Seawalls	free-standing structures typically made of concrete or rock and usually accompanied with infilling behind the wall		
Piles	Piers	normally extending out at right angles to shore into deep water to provide moorage on both sides	shading of marine plants disruption of sediment drift intensified wave reflection and resonance short term disruption	
	Wharves	generally run parallel to shore with storage for industrial commodities on the wharf deck		
	Jetties	linear structures similar to breakwaters built out from shore to control sedimentation at the mouth of a river		
	Docks	structures used for mooring small vessels and pleasure boats - may be fixed/permanent (piles) for floating (tethered to shore or connected via ramp). Specialty docks include cantilever, suspension and lift docks	shading disruption of shore drift patterns shore damage bottom habitat (dredging) operational pollution	
Float				
Dykes		berms constructed to prevent flooding of low lying lands	removal of natural water flows reduced shoreline complexity straighter shoreline, reduced habitat complexity	
Marine	point	"end-of-pipe" associated with industrial and municipal outfalls		

	stormwater runoff	Reduced soil porosity due to upland modification results in increased surface water collection. Marine discharge may be through storm sewer system or via overland flow	freshwater pulses may modify salinity, temperature erosional effect due to high flow rates sedimentation and introduction of terrestrial pollutants – fertilizers, oil, etc	
	sewage outfalls	Disposal of municipal wastes. Impact of discharge modified by extent of pre discharge treatment and dispersal rate in marine environment (current, depth)	alteration of biological oxygen demand – algal blooms introduction of pollutants from upland sources	
	industrial discharges	Disposal of industrial wastes. Impact of discharge modified by extent of pre discharge treatment and dispersal rate in marine environment (current, depth)	introduction of chemical pollutants temperature concerns where cooling water discharged above ambient temperatures	
	non-point	arise from diffuse sources, less easy to identify and/or control for example, failing septic fields, surface runoff		
	ocean disposal	disposal of soil and solid waste at sea.	Localised smothering of seabed, modification of benthic environment potential for harmful chemical or bilological effects dependent on material discharged	Navigable Waters Protection Act mandates 20 fathom depth for dumping of soil, dredged material, rock and ash

Use/Resource Compatibility and Referral Requirements : Shellfish Beach Aquaculture

Water Depth	
Salmon Stream (mouth)	S- Shellfish culture is not to be conducted within the braided channels of any salmonid creek. (SMP) T - Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP)
Clam/ Oyster Beach	R - No overlap, referral to WLAP required if application is within 100m (MOU)
Eelgrass Beds	NC: No overlap – 5m minimum (SMP) R: referral to WLAP required if application is within 100m. (MOU) S: Installation of any structures must not alter or disrupt eelgrass habitats (MOU,SMP)
Kelp Beds	NC - No gear and/or floating structures to be established over kelp bed habitats (SMP)
Rocky Reefs	NC - No gear and/or floating structures to be established over rocky reef habitats (SMP)
Estuaries/ Lagoons	R: Referral to WLAP required if application is within100m(MOU)
Salt Marshes and Mudflats	R: Where identified as a sensitive ecosystem, a provincial tenure is required for applications within 30m (MOU) M - Installation of any structures must not alter or disrupt salt marsh habitats (SMP)
Seal/ Sea lion Haulout	R: Referral to WLAP required if application is within 500m (MOU)
Whale Feeding Areas or Migration Pathways	R: Referral to WLAP required if application is within 500m (MOU)
Eulachon Migration and Rearing	T - Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP)
Herring Spawning and Migration	T - Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP)
Waterfowl habitat	M – Uncultivated or harvested "leave strips" should be incorporated within the design of beach culture tenures to minimize overall impact on shore birds. Leave strips to cover at least 30% of the tenure area at any given time. (MOU BMP) T - Where possible, aquaculture activity should take place during periods of low bird use (Both seasonal and diurnal) (MOU BMP)
Seabird Colonies	R: Referral to WLAP required if application is within 500m - Includes rafting and congregating areas as well as colonies (MOU)
Wildlife Trees/ Heronries	R: Referral to WLAP required if application is within 100m (MOU)
Invertebrate Habitat	R: Where identified as a sensitive ecosystem, a provincial tenure is required for applications within 30m (MOU)
Red/ Blue Species	M – species specific considerations
Parks, Ecological Reserves, Marine Protected Areas	NC
Areas of significant heritage or cultural value	To be addressed through referrals to MSRM: Archaeology and Registry Services Branch and affected First Nations

Use/Resource Compatibility and Referral Requirements: Shellfish Deep Water Aquaculture

Water Depth	
Salmon Stream (mouth)	S - Shellfish culture is not to be conducted within the braided channels of any salmonid creek. (SMP) T - Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP)
Clam/ Oyster Beach	R - No overlap. Referral to WLAP required if application is within 100m (MOU)
Eelgrass Beds	NC - No overlap – 5m minimum buffer(SMP) R: Referral to WLAP required if application is within 100m. (MOU) S: Installation of any structures must not alter or disrupt eelgrass habitats (MOU,

	SMP)
Kelp Beds	NC - No gear and/or floating structures to be established over kelp bed habitats (SMP)
Rocky Reefs	NC - No gear and/or floating structures to be established over rocky reef habitats (SMP)
Estuaries/ Lagoons	R: Referral to WLAP required if application is within 100m (MOU)
Salt Marshes and Mudflats	R: Where identified as a sensitive ecosystem, a provincial tenure is required for applications within 30m (MOU) M - Installation of any structures must not alter or disrupt salt marsh habitats (SMP)
Seal/ Sea lion Haulout	R: Referral to WLAP required if application is within 500m (MOU)
Whale Feeding Areas or Migration Pathways	R: Referral to WLAP required if application is within 500m (MOU)
Eulachon Migration and Rearing	T - Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP)
Herring Spawning and Migration	T Activities are to be timed to minimize impacts on plants and animals (e.g. avoiding main spawning windows) (SMP) M – Herring spawn on longlines be left until eggs hatch and larvae emerge (SMP)
Waterfowl habitat	M - Longline netting (where used) should extend a minimum of 20m below the surface of the water to minimize conflict with diving ducks. (MOU BMP) T - Where possible, aquaculture activity should take place during periods of low bird use (Both seasonal and diurnal) (MOU BMP)
Seabird Colonies	R: Referral to WLAP required if application is within 500m Includes rafting and congregating areas as well as colonies (MOU)
Wildlife Trees/ Heronries	R: Referral to WLAP required if application is within 100m (MOU)
Invertebrate Habitat	R: Where identified as a sensitive ecosystem, a provincial tenure is required for applications within 30m (MOU)
Red/ Blue Species	M: species specific considerations
Parks, Ecological Reserves, Marine Protected Areas	NC
Areas of significant heritage or cultural value	R: Address through referrals to MSRM: Archaeology and Registry Services Branch and affected First Nations

Siting and Compatibility Criteria for Finfish Aquaculture

Water Depth	
Salmon Stream (mouth)	S: 1km from mouth of salmonid-bearing stream as determined to be significant by DFO and the Province (FMP)
Clam/ Oyster Beach	S: 125m /300m A minimum spacing of 125 m is required from all shellfish beds and commercial shellfish growing operations. (FMP) At least 300m must separate finfish aquaculture sites and inter-tidal shellfish beds that have regular or traditional use for First Nations, recreational or commercial fisheries where beds are exposed to water flow from a salmon farm. (FMP)
Eelgrass Beds	M - Where identified as sensitive (as defined by DFO and the province), fish habitat an appropriate siting distance will be determined by DFO and the Province. (FMP)
Kelp Beds	M - Where identified as sensitive (as defined by DFO and the province), fish habitat, an appropriate siting distance will be determined by DFO and the Province. (FMP)
Rocky Reefs	M - Where identified as sensitive(as defined by DFO and the province), fish habitat, an appropriate distance will be determined (FMP)
Estuaries/ Lagoons	M - Where identified as sensitive (as defined by DFO and the province), fish habitat, an appropriate distance will be determined by DFO and the Province (FMP)
Salt Marshes and Mudflats	M - Where identified as sensitive (as defined by DFO and the province), fish habitat, an appropriate distance will be determined by DFO and the Province (FMP)
Seal/ Sea lion Haulout	M - Appropriate distance from areas extensively used by marine mammals to be

	determined by DFO and the Province.(FMP)
Whale Feeding Areas or Migration Pathways	M - Appropriate distance from areas extensively used by marine mammals to be determined by DFO and the Province.(FMP)
Eulachon Migration and Rearing	M
Herring Spawning and Migration	1km - Where herring spawning areas are designated as vital, major or important by DFO and the Province. (FMP)
Waterfowl habitat	-
Seabird Colonies	-
Wildlife Trees/ Heronries	-
Invertebrate Habitat	S - Where invertebrate habitat includes surveyed commercial dive fishery areas, siting should ensure that surveyed areas are not alienated from harvesting (FMP)
Red/ Blue Species	M – species specific considerations
Parks, Ecological Reserves, Marine Protected Areas	1km - Siting not within line of sight up to 1km in all directions from existing or approved proposals for federal, provincial or regional parks and MPAs, existing or approved proposals for ecological reserves <1000ha (FMP)
Areas of significant heritage or cultural value	R: Address through referrals to MSRM: Archaeology and Registry Services Branch and affected First Nations

Siting and Compatibility Criteria for Log handling storage and infrastructure

Water Depth	S: Log boom and booming grounds require water depth at least 20m. (MOU) S: Heli-log drop areas require water depth at least 25m and are not allowed to strike bottom when released. (MOU) S: Log dumps must be located so that logs can be watered at any tide without grounding (MOU).
Salmon Stream (mouth)	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m (MOU)
Clam/ Oyster Beach	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 200m (MOU) S: Intertidal wood storage is not permitted, suitable precautions to be taken to ensure this does not occur under any conditions of tide, current, weather. Dragging of logs across beach areas is not permitted (MOU)
Eelgrass Beds	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m (MOU)
Kelp Beds	-
Rocky Reefs	-
Estuaries/ Lagoons	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m (MOU)
Salt Marshes and Mudflats	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m (MOU)
Seal/ Sea lion Haulout	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 500m (MOU)
Whale Feeding Areas or Migration Pathways	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 1km from migration pathways only (MOU)
Eulachon Migration and Rearing	M: To be determined on a site by site basis (DFO BMP)
Herring Spawning and Migration	T: refer to DFO for timing windows associated with herring spawn activities
Waterfowl habitat	-
Seabird Colonies	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 200 m from seabird congregating areas and 1km from seabird colonies, (MOU)
Wildlife Trees/ Heronries	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m for wildlife trees, 300m from Heronries. (MOU) S: Helicopter flight paths should be routed a minimum of 1 km from eagle nest trees

	or Heronries (MOU BMP)
Invertebrate Habitat	-
Red/ Blue Species	M: species specific considerations
Parks, Ecological Reserves, Marine Protected Areas	NC
Areas of significant heritage or cultural value	R: Address through referrals to MSRM: Archaeology and Registry Services Branch and affected First Nations

Siting and Compatibility Criteria for Private Docks

Water Depth	M - Boats, floats and other floating structures should be located and firmly moored in deep water, far enough offshore to prevent grounding at low tide (MOU BMP)
Salmon Stream (mouth)	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m from spawning areas
Clam/ Oyster Beach	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 125m
Eelgrass Beds	NC - Not compatible except where approved by DFO
Kelp Beds	NC - Not compatible except where approved by DFO
Rocky Reefs	-
Estuaries/ Lagoons	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 100m
Salt Marshes and Mudflats	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 30m
Seal/ Sea lion Haulout	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 250m
Whale Feeding Areas or Migration Pathways	-
Eulachon Migration and Rearing	-
Herring Spawning and Migration	-
Waterfowl habitat	-
Seabird Colonies	S: In the absence of a response from DFO, WLAP recommends a minimum separation of 500m a from seabird colony, 100m from seabird congregating areas
Wildlife Trees/ Heronries	-
Invertebrate Habitat	-
Red/ Blue Species	-
Parks, Ecological Reserves, Marine Protected Areas	NC
Areas of significant heritage or cultural value	R: Address through referrals to MSRM: Archaeology and Registry Services Branch and affected First Nations

Siting and Compatibility Criteria for Communication Sites

Water Depth	-
Salmon Stream (mouth)	30m
Clam/ Oyster Beach	-
Eelgrass Beds	-
Kelp Beds	-
Rocky Reefs	-
Estuaries/ Lagoons	30m
Salt Marshes and Mudflats	-
Seal/ Sea lion Haulout	200m
Whale Feeding Areas or Migration Pathways	
Eulachon Migration and Rearing	

Herring Spawning and Migration	
Waterfowl habitat	
Seabird Colonies	NC - no overlap with seabird colonies accepted except in critical situations where no other option exists. Referral required (MOU)
Wildlife Trees/ Heronries	100m
Invertebrate Habitat	
Red/ Blue Species	
Parks, Ecological Reserves, Marine Protected Areas	
Areas of significant heritage or cultural value	

Siting and Compatibility Criteria for Private / Public Utilities

Water Depth	
Salmon Stream (mouth)	30m - Distance specified for salmonid spawning areas
Clam/ Oyster Beach	60m
Eelgrass Beds	30m
Kelp Beds	
Rocky Reefs	
Estuaries/ Lagoons	60m
Salt Marshes and Mudflats	NC
Seal/ Sea lion Haulout	100m
Whale Feeding Areas or Migration Pathways	
Eulachon Migration and Rearing	
Herring Spawning and Migration	
Waterfowl habitat	
Seabird Colonies	300m - Alternately installation to occur outside of nesting/rearing period.
Wildlife Trees/ Heronries	100m
Invertebrate Habitat	
Red/ Blue Species	
Parks, Ecological Reserves, Marine Protected Areas	
Areas of significant heritage or cultural value	

Siting and Compatibility Criteria for Floating Lodges and Base Camps

Water Depth	
Salmon Stream (mouth)	30m 60m 300m - 30 m buffer for streams except stream approaches and crossings; 60m buffer specified for salmonid spawning areas. 300m specified for grizzly and/or black bear fishing sites. (MOU) 15m30m - Spacing specified for sanitary and domestic waste facilities. 15m separation is the minimum acceptable buffer for self-contained or composting facilities, 30m for all others.
Clam/ Oyster Beach	60m 150m - 150m distance required for docks and outfalls (MOU) 15m30m - Spacing specified for sanitary and domestic waste facilities. 15m separation is the minimum acceptable buffer for self-contained or composting facilities, 30m for all others.
Eelgrass Beds	NC
Kelp Beds	30m - Where identified as a sensitive ecosystem (MOU)
Rocky Reefs	30m - Where identified as a sensitive ecosystem (MOU)

Estuaries/ Lagoons	30m - Raised walkways may be acceptable (MOU)
Salt Marshes and Mudflats	30m
Seal/ Sea lion Haulout	
Whale Feeding Areas or Migration Pathways	
Eulachon Migration and Rearing	
Herring Spawning and Migration	
Waterfowl habitat	
Seabird Colonies	200m
Wildlife Trees/ Heronries	100m/ 200m - 200m for heronries (MOU)
Invertebrate Habitat	
Red/ Blue Species	
Parks, Ecological Reserves, Marine Protected Areas	
Areas of significant heritage or cultural value	
Siting and Compatibility Criteria for Commercial Recreation Guiding	
Water Depth	
Salmon Stream (mouth)	15m 30m - Spacing specified for sanitary and domestic waste facilities. 15m separation is the minimum acceptable buffer for self-contained or composting facilities, 30m for all others.
Clam/ Oyster Beach	15m30m - Spacing specified for sanitary and domestic waste facilities. 15m separation is the minimum acceptable buffer for self-contained or composting facilities, 30m for all others.
Eelgrass Beds	
Kelp Beds	
Rocky Reefs	
Estuaries/ Lagoons	NC - Kayak landing sites should be located away from estuaries and lagoons. Landing sites should be located and used in a way to minimize physical and biological impacts to the foreshore (MOU BMP)
Salt Marshes and Mudflats	NC - Kayak landing sites should be located away from salt marshes. Landing sites should be located and used in a way to minimize physical and biological impacts to the foreshore (MOU BMP)
Seal/ Sea lion Haulout	
Whale Feeding Areas or Migration Pathways	
Eulachon Migration and Rearing	
Herring Spawning and Migration	
Waterfowl habitat	
Seabird Colonies	
Wildlife Trees/ Heronries	
Invertebrate Habitat	
Red/ Blue Species	
Parks, Ecological Reserves, Marine Protected Areas	
Areas of significant heritage or cultural value	

Supporting Information for Environmental Risk

Figure A5.1: General Approach to Environmental Risk Assessment for Individual Planning Units

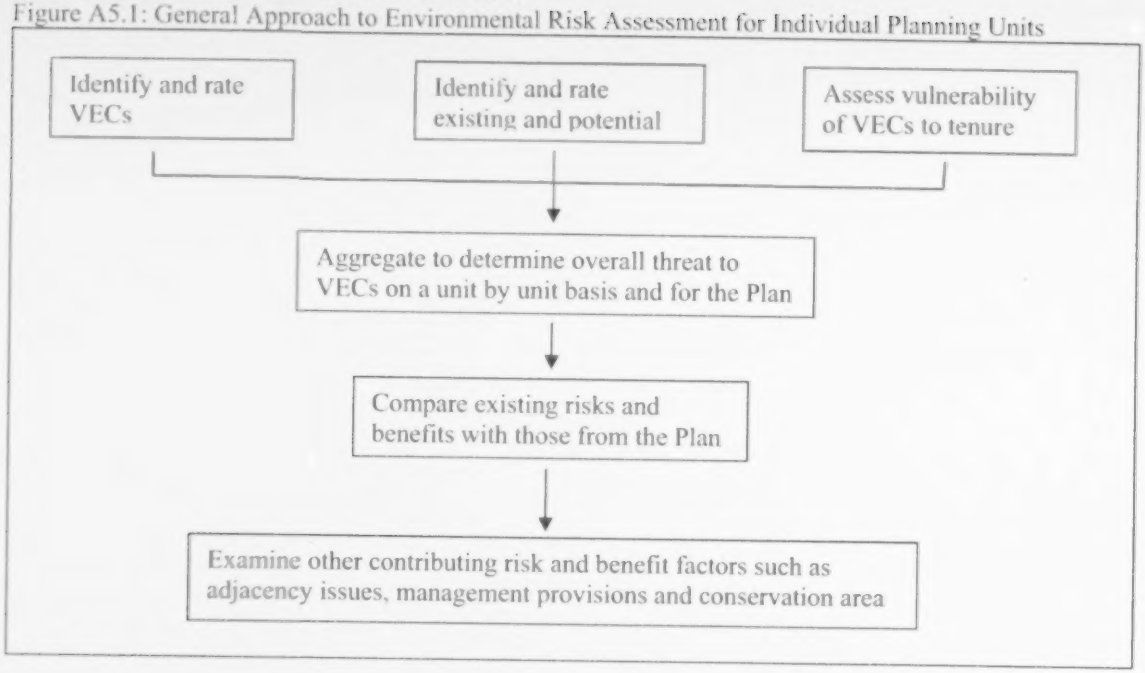

Identify and rate VECs
Identify and rate existing and potential
Assess vulnerability of VECs to tenure
Aggregate to determine overall threat to VECs on a unit by unit basis and for the Plan
Compare existing risks and benefits with those from the Plan
Examine other contributing risk and benefit factors such as adjacency issues, management provisions and conservation area

Figure A5.2. Rating scheme for Valued Environmental Components

Valued Environmental Component	Measurement	Rating
Kelp beds	# hectares/bed	1 = >0 - < 200 ha 2 = 200 - < 400 ha 3 = > 400 ha
Clam beaches	# hectares/bed	1 = >0 - < 50 ha 2 = 50 - < 100 ha 3 = > 100 ha
Salmon streams	# salmonid streams	1 = > 0 - < 10 streams 2 = 10 - < 20 streams 3 = > 20 streams
Eelgrass	# hectares/bed	1 = >0 - < 50 ha 2 = 50 - < 100 ha 3 = > 100 ha
Birds	Presence	3 = CWS area of interest
Sea Otters, Seal and sea lions	Presence	3 = occurrence of haul out and rafting sites

Figure A5.3. Rating scheme for existing tenures

Existing Tenures	Rating

0	0
< 10	1
10 - <20	2
> 20	3

Figure A4. Rating scheme for VEC/land use interactions

VECs → Tenured Activities ↓	Kelp (K)	Clam (C)	Salmon (S)	Eelgrass (E)	Birds (B)	Pinnipeds (P)
Shellfish Beach Aquaculture (SBAQ)	1	2a	1	1	1	1
Shellfish Deepwater Aquaculture (SDAQ)	1	2a	1	1	1	1
Finfish Aquaculture (FFAQ)	1	1	2b	1	2c	2d
Marine Plant Aquaculture (MPAQ)	1	1	1	1	2e	2e
Marine Residential (MR)	3f	3f	3f	3f	3f	3f
Floating Lodges & Base Camps (FLBC)	1g	1	1	1	2h	2h
Boat Launches (BL)	2	1	1	2	1	1
Commercial Recreation (CR)	3i	3i	3i	3i	3i	3i
Log Handling, Log Booming, Heli Log Drops (LH, LB, HL)	2j	1	1	2j	1	1
Private Moorage (PM)	2k	1	1	2k	1	1
Light Docks and Wharves(LDW)	3i	3i	3i	2i	3i	3i
Heavy Docks and Wharves (HDW)	3i	3i	3i	2i	3i	3i
Marine Telecommunications & Utilities (MTU)	2l	2l	1	2l	1	1

Potential interactions were rated on a scale from 0 to 3 as follows:
0 = There is likely no interaction between VEC and activity
1 = Siting criteria and other mitigation measures reduce impact considerably or VEC has limited sensitivity to activity.
2 = Siting criteria apply but there is residual impact, or no siting criteria apply and VEC is moderately sensitive to the activity.
3 = No siting criteria or mitigation measures apply and significant impact is likely

Notes on specific interactions:
Siting criteria prohibit overlap, but potential impact on natural beds from broadcasting.
1 km separation distance required, but potential for larger scale impact due to escapement.
No separation distance required and potential impact to birds being attracted to sites.
Although management provisions in place, no separation distance is required.
No siting criteria and potential for birds and pinnipeds to be disturbed by activity.
No siting criteria required and potential significant impact from physical structures, waste discharges and disturbance to birds and pinnipeds.
No siting criteria and potential impact from underwater recreation activities such as diving.
No siting criteria and potential impact due to disturbance.

No siting criteria required and potential impact from physical structures or from affecting water flow and sedimentation patterns.
No separation distance or specific management provisions and potential impacts could result from woody debris.
Siting criteria prohibit overlap, but potential impact from affecting water flow and sedimentation patterns.
No siting criteria required and potential impact from physical structures.

Figure A5.4. Rating scheme for acceptability of tenure applications

Recommendation	Rating
Not Acceptable (X)	0
Conditionally Acceptable (O), Acceptable (✓)	1

Figure A5.5. Rating scheme for environmental risk

Unit risk total	Rating
< 50	Low
50 - < 100	Moderate
>= 100	High

Appendix VI. References

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